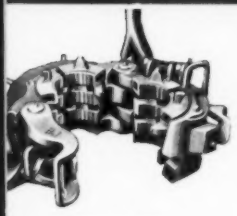
the OIL AND GAS JOURNAL


BJ DRILLING AND PRODUCTION TOOLS...

TYPE "WS" WIDE FACE TONG

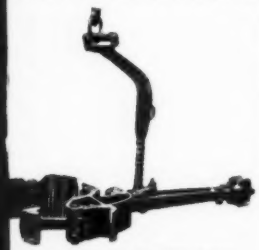


SIDEDOOR SLIP CASING ELEVATOR

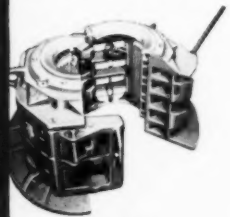
TYPE "Y" CENTER LATCH SLIP TYPE CASING ELEVATOR for External Upset Casing

TYPE "P" ELEVATOR for External Upset Pipe and Casing

POWER TUBING SPIDER



"E" WIDE FACE CASING TONG



CASING SPIDER

...ARE FIELD ENGINEERED TO GIVE YOU

**MAXIMUM SAFETY**—BJ's consistent improvement of features that effect greater safety and operating convenience—tested to safety factors far beyond the recommended usage—provide for maximum safety, speed and efficiency on all jobs.

**SPEED**—BJ tools are engineered to the latest designs for fast and efficient handling. Crews work better and faster when they know that the tools they are working with have been designed and built to the highest standards of safety and strength, and that the chances of accident have been reduced to a minimum.

**STRENGTH**—the latest engineering and metallurgical research—plus continuous testing and development combine to give BJ tools the extra strength and construction advantages needed by drilling and production crews handling today's heavy equipment at high speeds.

For better performance on rigs everywhere—specify and buy BJ engineered OIL TOOLS. See your local BJ representative today.

BJ means Engineered OIL TOOLS

Byron Jackson Co.

Since 1872

MAIN OFFICE & PLANT: LOS ANGELES 54, CALIF.

Mid-Continent Office & Plant: Houston 1, Texas

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JOBBERS IN ALL PRINCIPAL OIL FIELDS


PRICE 50 CENTS TABLE OF CONTENTS PAGE 103 FEBRUARY 25, 1952

Unit Rig has never had a parts replacement job that couldn't be done on the rig floor! Old parts may be removed and new parts installed right on the rig floor, because there are no press nor shrink fits that require special equipment.

Extremely close machine tolerances and repeated inspections assure quick and easy fitting without filing, grinding, welding or re-machining.

Prompt delivery of *parts that fit* is one more reason why you save time and money when you own Unit Rig equipment. Make your next drawworks a Unit Rig.

UNIT RIG & EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

**DESIGNED FOR THE JOB....**

UR-512

UNIT RIG DRAWWORKS ARE SOLD EXCLUSIVELY THROUGH THESE AUTHORIZED DISTRIBUTORS IN U.S.A. AND CANADA

BOVAIRD SUPPLY COMPANY — IVERSON SUPPLY COMPANY — MID-CONTINENT SUPPLY COMPANY
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HOWARD SUPPLY COMPANY — LUCEY PRODUCTS CORPORATION — OIL WELL SUPPLY COMPANY

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Walworth manufactures a *complete line* of Gate, Globe, Angle, Check, and Lubricated Plug Valves, made of Stainless Steel, Steel, Iron, Bronze, and Special Alloys in a wide range of sizes and temperature-pressure ratings.

Fittings of steel, iron, and bronze are also manufactured in all conventional types and sizes.

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**valves and fittings**

**60 East 42nd Street, New York 17, N. Y.**

Distributors in principal centers throughout the world

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# We "Cooled Off" the Hot Spots for Longer Motor Life!

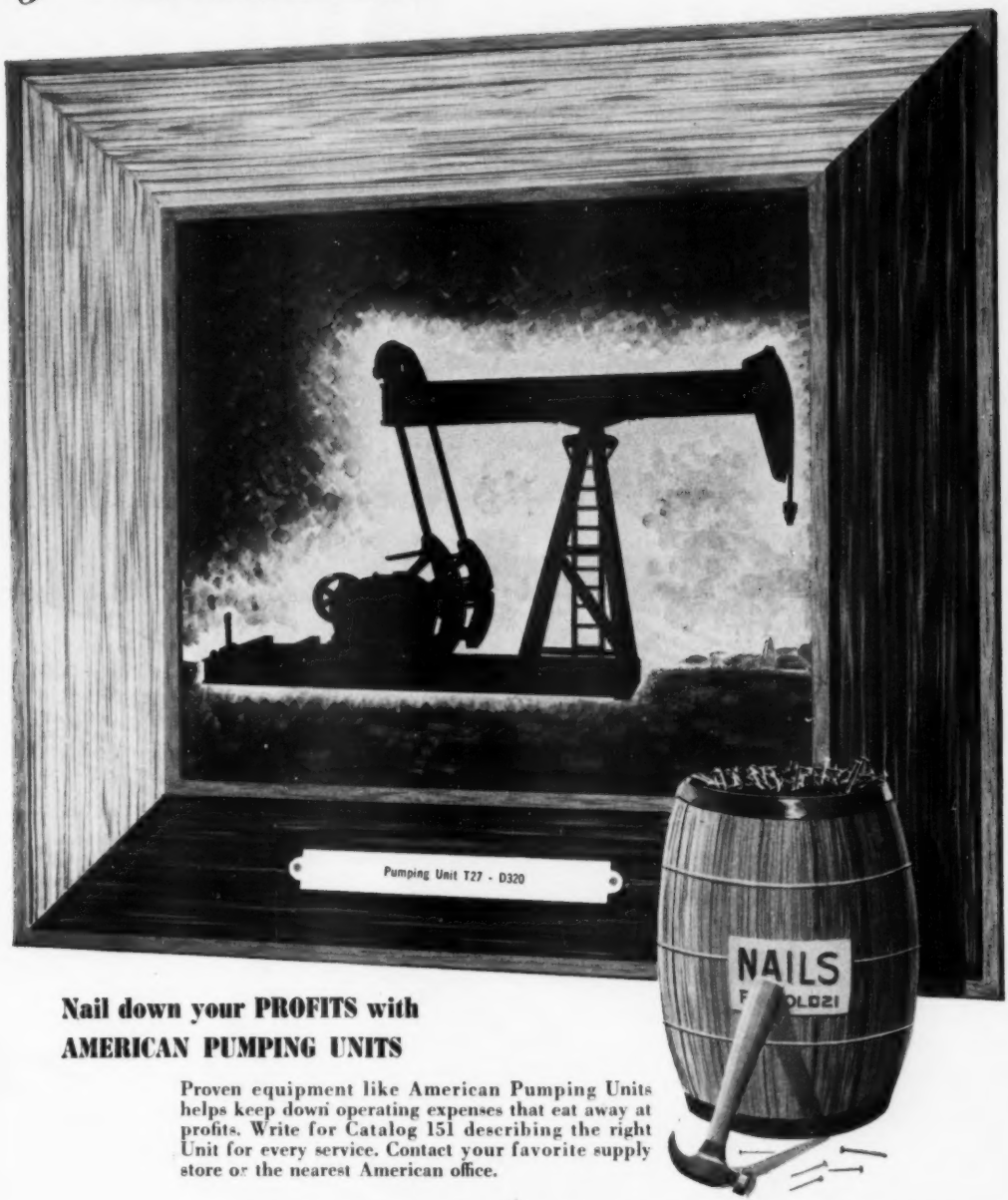
You'll find no hot spots in a Fairbanks-Morse Motor. Unique cross-flow ventilation assures uniform motor cooling . . . eliminates the hot spots that are so destructive to a stator insulation. Air is taken in at each end of the motor, flows through separated passageways across the stator core, and is exhausted simultaneously at opposite ends. This advantage is standard on all popular size Fairbanks-Morse General Purpose Motors.

Combine cross-flow ventilation with exclusive, indestructible Copperspun Rotors, protected, one-piece cast frame and rugged construction and you'll see why it pays to specify Fairbanks-Morse for your oil field motors. Fairbanks, Morse & Co., Chicago 5, Illinois.

**FAIRBANKS-MORSE,**
***a name worth remembering***

OIL FIELD EQUIPMENT • PUMPS • SCALES
ELECTRIC MOTORS • GENERATORS • LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES • MAGNETOS

*Great* **AMERICANS**




**Nail down your PROFITS with**
**AMERICAN PUMPING UNITS**

Proven equipment like American Pumping Units helps keep down operating expenses that eat away at profits. Write for Catalog 151 describing the right Unit for every service. Contact your favorite supply store or the nearest American office.

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# Almost

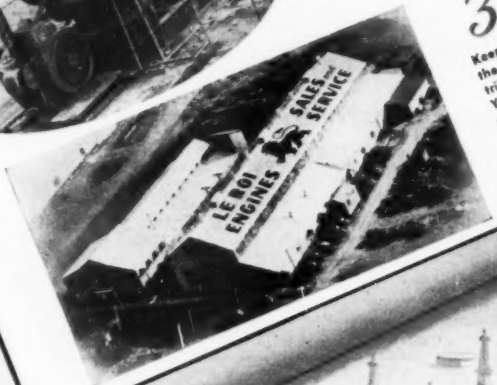
## Le Roi 3 way Partnership

### 1. Better Engines

Le Roi's A288, for example. It has a wide speed range of 360 to 720 rpm. Its removable wet cylinder sleeves and other construction features simplify maintenance, reduce replacement costs. No shut-down is necessary for periodic inspections.

### 2. Better Applications

Exclusive Le Roi distributors are all-field power specialists. They know engines. That's why they can select the right power unit for any application. That's why you can count on Le Roi for dependable, low-cost power.




### 3. Better Service

Keeping your Le Roi engines running is the sole responsibility of our distributors. They handle only Le Roi. You get personal attention from engine experts. Large parts-stocks and skilled mechanics assure prompt service and a minimum of down-time.

# Indestructible!

# Le Roi A288 Pumping Engine

**One typical installation shows more than 35,000 hours and it's just beginning its useful life. That's stamina — proof that Le Roi's A288 puts you way ahead of the field!**

YOU don't have to pamper this pumping engine. No, sir — not Le Roi's A288. It's built to pump more oil — longer — safer — and with less maintenance — than any other well-pumping engine!

The A288 is the only engine to be recommended by one major pumping-engine user for continuous service *unattended for up to two weeks at a time.*

***Here are just a few of the reasons for the A288's unfailing dependability:***

- Patented, closed "vaporizing-condensing" cooling system requires almost no make-up water — keeps temperatures high and prevents sludging even in sour-gas areas.
- Heavy flywheel maintains even-speed operation under unbalanced loads.
- You don't have to shut down the A288 for periodic inspections or for adding oil.
- Big crankcase oil capacity permits long intervals between oil filling.
- There are no grease fittings, belts, or other accessories that need attention.

Let your Le Roi distributor tell you more about the A288 — and show you installations. See for yourself why you're way ahead of the field, when you let Le Roi's 3-way partnership work for you.

**LE ROI COMPANY**

**MILWAUKEE 14, WISCONSIN**

***Plants:* Milwaukee • Cleveland • Greenwich, Ohio — *Oil Field Headquarters:* Tulsa, Oklahoma**

LE ROI

**See these Le Roi Distributors for a Profitable 3-way Partnership**

**Oklahoma**
Le Roi Company Branch — Tulsa
Carson Machine & Supply Co. — Oklahoma City

**East & South Texas, Gulf Coast**
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, Louisiana.

**North & West Texas, New Mexico**
General Machine & Supply Co. — Odessa, Snyder, Texas.
Norton Engine & Equipment Co. — Wichita Falls, Texas.

**Kansas**
Carson Machine and Supply Co. — Great Bend

**Illinois — Western Kentucky**
Western Machinery & Engine Company — Centralia, Illinois and St. Louis, Missouri.

**Typical Le Roi Service Facility**

Here's the efficient well-arranged parts department of the Le Roi-Rix Co.'s Long Beach branch. Two more offices — at Bakersfield and Los Angeles — are similarly equipped. All three offices maintain prompt 24-hour service. Le Roi has service facilities like these throughout the oil fields — another reason why you can depend on Le Roi.

**Michigan**
Motor Engine Service — Reed City

**Rocky Mountain Area**
Gehring Equipment Co. — Casper, Wyoming, Rangeley, Col.

**Northern Louisiana & Mississippi**
Ingersoll Corporation — Shreveport, Louisiana, and Jackson, Mississippi.

**West Coast**
Le Roi-Rix Machinery Co. — Los Angeles, Long Beach and Bakersfield, Calif.

**Appalachian Area**
P. C. McKenzie Co., Pittsburgh, Bradford.

**Canada**
Lucey Export Ltd. — Calgary, Edmonton, Alberta.

P-111

# FREE

## LOCKED-IN PRODUCTION IN OLD and NEW WELLS!

WITH

# HALLIBURTON MORFLO

## Breaks Water and Emulsion Blocks

WATER in the oil bearing formation is a major obstacle to production. It can block the flow of oil and reduce permeability. It can form emulsions with oil and plug channels of production.

But you can quickly and easily unlock the pay zones in your wells by treating with Halliburton Morflo, a new double-action discovery.

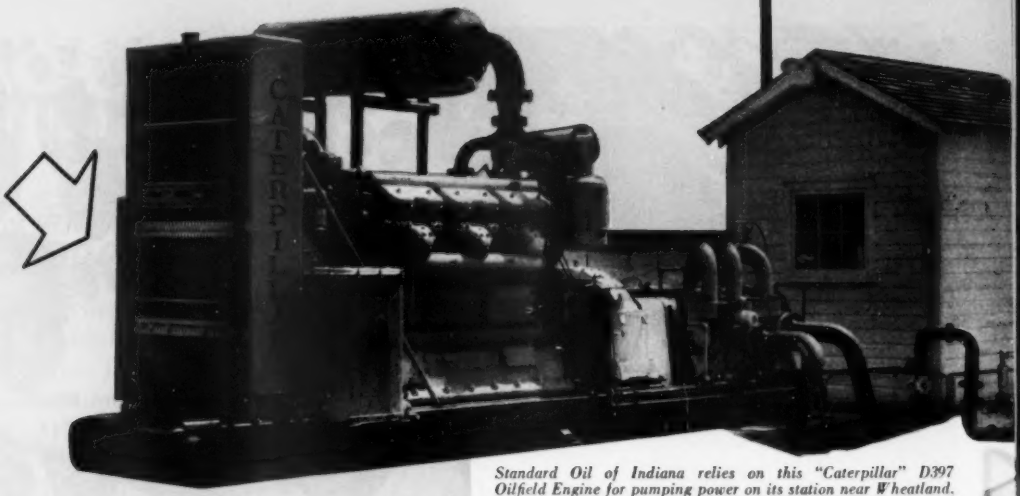
Morflo means just that. It contacts free water in the formation as well as water imprisoned in emulsions, cuts surface tension by more than 50%, breaks the emulsion, reduces viscosity — and thus increases production by greatly lowering resistance to flow!

Morflo is easy to use, requires no special equipment. It is mixed in small proportions with light crude and diesel fuel and displaced into the formation by pumping. It has proved highly successful in both old and new wells.

*Give your wells every chance to produce more oil. Phone your nearby Halliburton representative about Morflo. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.*

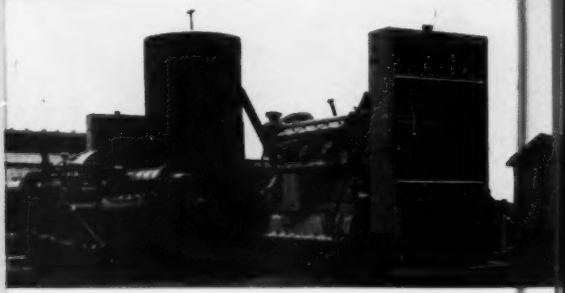
**HALLIBURTON**

YEARS AHEAD IN PRODUCTION TECHNIQUES!




*Standard Oil of Indiana relies on this "Caterpillar" D397 Oilfield Engine for pumping power on its station near Wheatland, Wyoming. Capacity of the station's Byron-Jackson pump with Farrel Birmingham speed increaser is 18,800 barrels per day.*

# They've got all it takes for pipe-line pumping



*Interprovincial Pipe Line Co. uses these two "Caterpillar" D386 Oilfield Engines to power its pumping station in Edmonton, Alberta. The operator states that these engines are proving to be very satisfactory.*

NOTICE where these "Caterpillar" Oilfield Engines are working. They're on these jobs because they deliver the kind of power that pays off in pipe-line pumping. For the same solid reason, you'll find other "Cat" Oilfield Engines on similar jobs all over the world.

Operators know from experience you don't have to pamper these engines – they can run unattended. And they can run on crude oil without fouling. What's more, their power is *honestly* rated. When you get a "Cat" Oilfield Engine, you can count on it to deliver *all* the power advertised. Whatever your needs, there's one unit or a combination to meet them, for these engines range up to 500 hp. for maximum duty and up to 400 hp. for sustained, day-in and day-out runs. To safeguard your setup, they can be equipped with automatic shutdown devices.

*Facts* are what you want – and *facts* are what you get from your "Caterpillar" Dealer. Take your pipe-line pumping problems to him – he'll give you *practical* answers. And remember, no matter where you're located, he'll back you up with efficient service. From any angle, "Cat" Oilfield Engines are a profitable investment.

**CATERPILLAR, PEORIA, ILLINOIS**

**CATERPILLAR**
REG. U. S. PAT. OFF.

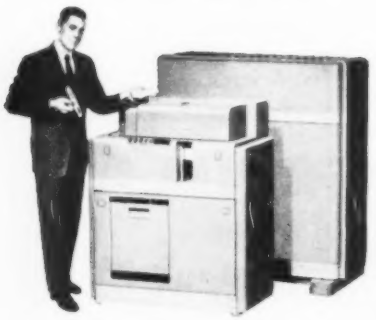
**Oilfield Engines**

# 150 Extra Engineers

An IBM Electronic Calculator speeds through thousands of intricate computations so quickly that on many complex problems it's like having 150 EXTRA Engineers.

No longer must valuable engineering personnel . . . now in critical shortage . . . spend priceless creative time at routine repetitive figuring.

Through the use of electronics, many thousands of valuable man hours have been saved in the accounting and research departments of the oil industry. IBM Electronic Business Machines are helping to meet urgent demands for greater production.



IBM

INTERNATIONAL BUSINESS MACHINES

# Served 3 Years

## *and drilled 16 wells—a total of 120,000 feet of hole*

OPERATORS of one southwestern drilling rig turned to the G.T.M. —Goodyear Technical Man—for recommendations on rotary hose. The Style 3153—built with Goodyear's exclusive integrally streamlined coupling at the factory—drilled 120,000 feet of hole in sinking 16 wells.

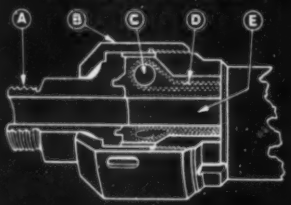
Style 3153 is built to handle extreme bottom-hole pressures at levels down to 15,000-20,000 feet — is tested at 5000 lbs. psi. before shipment. Ask your supplier for details, or write Goodyear, Akron 16, Ohio.

*We think you'll like "THE GREATEST STORY EVER TOLD" Every Sunday — ABC Network*

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

**-Specified**

ROTARY HOSE FITTING with integrally streamlined end




A—threaded adapter attached to goose neck

B—streamlined shell

C—annular ring of steel reinforces hose end

D—multi-ply reinforcement of hose

E—mud-, sand-, oil- and abrasion-resistant tube

**FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS** *built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor. Look for him in the yellow pages of your Telephone Directory.*

# GOODYEAR

**THE GREATEST NAME IN RUBBER**

# CHAPMAN LIST 960

## *the one Forged Steel Gate Valve that gives you this* 4-WAY PROTECTION

**Extra Protection Against Even Unusual Stress** is provided by extra-strong stem-and-wedge-gate connection.

**Repairs and Replacements Are Reduced** by super-hardened seat rings and gate faces of stainless steel.

**Longer-Lived Body and Yoke** are of forged steel. And bolted follower has no threads on yoke to corrode.

**No Seizing or Galling of Gate Faces** because List 960's gates (when furnished with certain types of trim) are hardened by *Malcomizing* (patented Chapman process) to a minimum of 800 Brinnell.

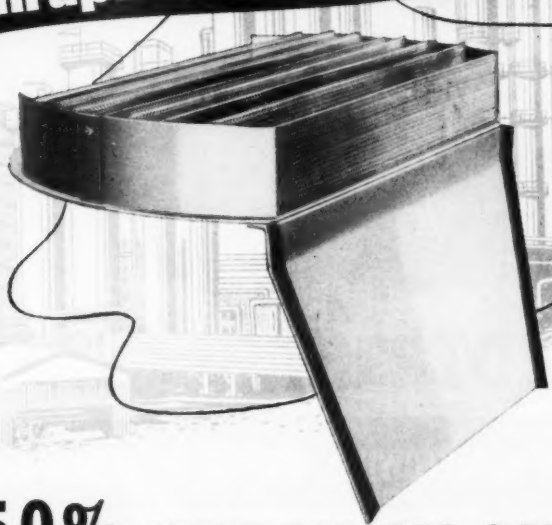
An exceptionally wide range of services is covered by this small forged steel gate valve . . . giving you the same consistent top level performance on many different jobs.

Chapman List 960 Forged Steel Gate Valves are manufactured in sizes from ½" to 2" inclusive, and in these 2 types: (1) Rising stem with yoke (shown), and (2) Rising stem with inside screw. Bonnet joints are either gasketed or metal-to-metal. Pressure range: 2000 lb. at 100°F. — 380 lb. at 1000°F. For higher pressures, specify List 990. Send for illustrated Catalog No. 10.

**THE CHAPMAN VALVE MFG. CO., INDIAN ORCHARD, MASS.**

30%

extra thruput GUARANTEED



UP TO 50% EXTRA THRUPUT *OBTAINED*
BY USING KOCH KASKADE FRACTIONATING TRAYS

**LEONARD REFINING CO.**
ALMA, MICHIGAN

Obtained increased thruput on 72" I. D., TCC synthetic crude tower to capacities of:

| | Liquid | Vapor |
|---|---|---|
| Volume | 115,300 #/hr. | 82,480 #/hr. |
| Density | 45.1 #/cf. | 175 #/cf. |
| $\Delta p$/tray | ..... | 1.38" $H_2O$ |

Koch Kaskade trays were installed on present supports—36" centers.

**PHILLIPS PETROLEUM CO.**
WOODS CROSS, UTAH, REFINERY

Obtained increased thruput on 30" diameter, 110# psig. poly stabilizer to capacities of:

| | Liquid | Vapor |
|---|---|---|
| Volume | 36,700 #/hr. | 20,000 #/hr. |
| Density #/CF | 29.6 | 1.317 |

Koch Kaskade trays were installed on 24" centers.

**WARREN PETROLEUM CO.**
RINGWOOD, OKLA., GASOLINE PLANT

Obtained increased capacity on 72" 750# natural gas absorber to:

| | Liquid | Vapor |
|---|---|---|
| Volume | 460 gpm (lean) | 75 mm. CF/D |
| Density #/CF | 38° API (lean) | 2.43 #/CF |

Koch Kaskade trays were installed on 26" centers.

**When extra thruput is your problem, it will pay you to investigate the economy and operating efficiency of Koch Kaskade Fractionating Trays. Write us today—no obligation.**

KOCH ENGINEERING COMPANY, INC.
DESIGNERS - MANUFACTURERS - BUILDERS
[illegible] WEST DOUGLAS — WICHITA 2, KANSAS
REPRESENTATIVES
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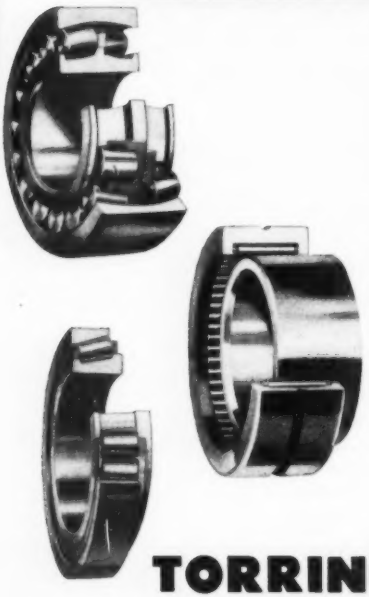
## an evergrowing list of satisfied customers



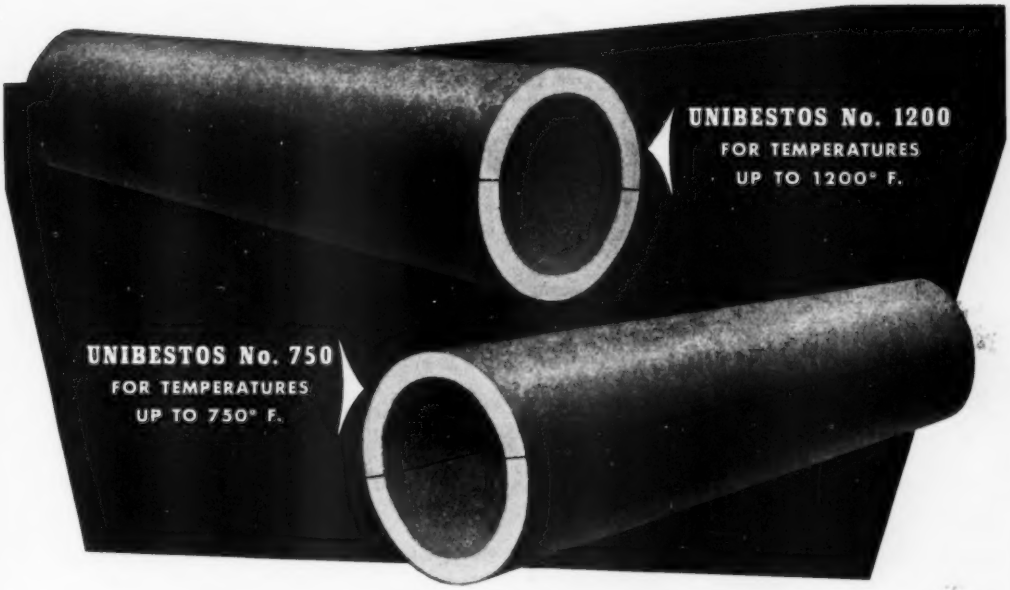
Throughout industry, leading builders and users of virtually every type of mechanical equipment rely on Torrington Bearings for long, trouble-free service under the most exacting operating conditions.

They rely on Torrington Engineers, too, for experienced assistance on design, installation and maintenance problems involving every type of anti-friction bearing. Why not tell us about *your* problem? We'll welcome the opportunity of serving you.

THE TORRINGTON COMPANY
South Bend 21, Ind. Torrington, Conn.
*District Offices and Distributors in Principal Cities of United States and Canada*

# TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers




# These famous UNIBESTOS twins cut heat loss and surface temperature

**HIGH EFFICIENCY IS UNIMPAIRED BY REUSE OR CONTINUOUS SERVICE**

When you insulate with Unibestos you can be sure of *prolonged* effectiveness, for this durable African Amosite product resists all service hazards. It's unaffected by moisture, steam, fumes . . . withstands impact and vibration . . . won't shatter, crumble, powder, or dust to contaminate the atmosphere under normal service conditions.

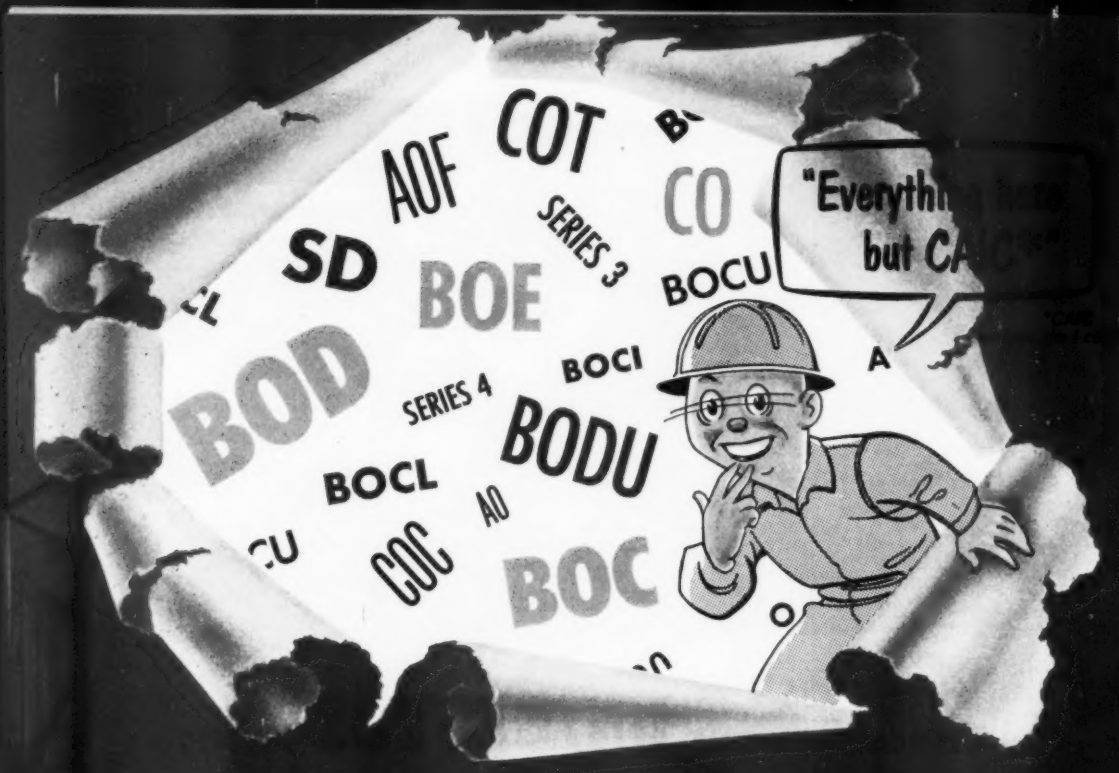
Unibestos is easy to cut and fit . . . brings you the added economy of *single-layer* application . . . may be removed and reused repeatedly without damage or loss of efficiency. Adjacent sections can be stapled together to prevent separation due to expansion.

Phone your Unarco Distributor for *money-saving* Unibestos in cylinders, half-rounds, or blocks.

UNARCO

**UNION ASBESTOS & RUBBER COMPANY**

DEPT. E-2 • 332 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS




# LANE-WELLS provides 354 Packers in 14 different types

Ask Your Lane-Wells Man About

**Engineered Packer Service** by

You won't find any CAIC in the list, because we're not confused. (Neither are the operators who use LANE-WELLS Packers and Engineered Packer Service.) For each one of these 14 different packers was designed and engineered to do a specific job—and years of field use have proved that these packers do these jobs very well indeed. And Engineered Packer Service, which is free to any operator, shows how you can apply packers to the best advantage on all types of completions, and how to get maximum service from your packer set-ups. Together, they make an unbeatable team, as many operators can testify.

**LANE WELLS**

*Tomorrow's Tools - Today!*

AP502

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

# P&H DIESEL ENGINES

2-CYCLE

## Almost any part FITS THEM ALL!

• Think how that cuts your costs . . . simplifies parts stocking . . . speeds up service. 80% of *all* parts fit *all* P&H Diesels—1, 2, 3, 4, and 6-cylinder models. For example, the standard cylinder and liner assembly can be replaced in *any* P&H Diesel in only 40 minutes. You don't even drop the pan. Greater interchangeability is one more reason you should standardize on P&H Diesels. Available in bare engines, power units and generator sets. Write for literature, Diesel Division, Harnischfeger Corporation, Crystal Lake, Illinois.

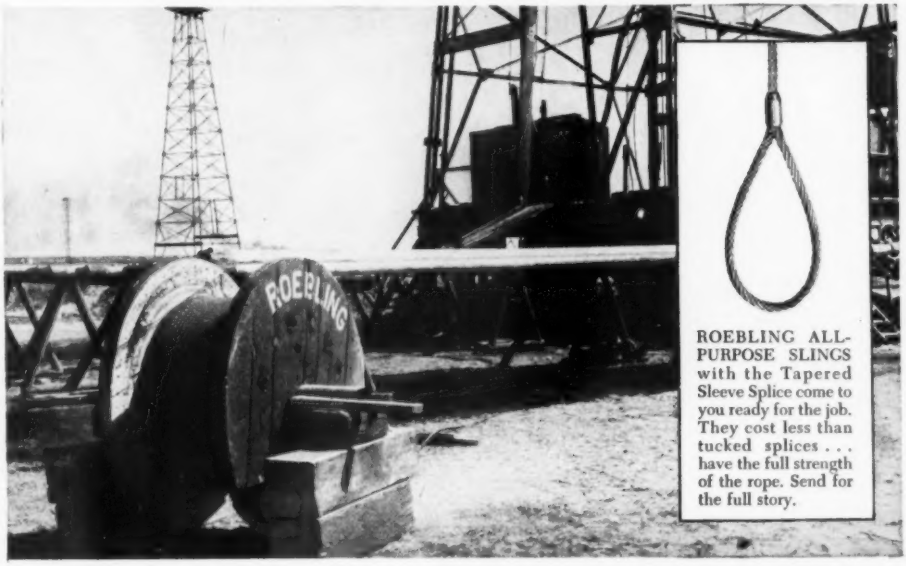
P&H DIESEL DIVISION
HARNISCHFEGER
CRYSTAL LAKE ILLINOIS, U.S.A.

# WIRE ROPE

## *You'll get more efficient, economical service with ROEBLING rope*

TIME AND DOLLAR SAVINGS are more important than ever in the oil fields. One sure way to save time and cut costs is to specify Roebling Preformed "Blue Center" Steel Wire Rope. Here's a tough rope that stands up under shocks, strains and high speeds. Its preforming assures maximum handling ease, better spooling and smooth performance.

Roebling makes a full line of wire rope. Have your Roebling Field Man recommend the *right* ropes for your requirements. And for longest life on the job, get his advice on the correct use and maintenance of wire rope. It is based on experience with thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.




ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices . . . have the full strength of the rope. Send for the full story.

# ROEBLING

**DISTRIBUTED BY THE NATIONAL SUPPLY COMPANY**
**REPUBLIC SUPPLY COMPANY**

# We applied the "strip-tease" principle to dealer education

Oil company executives who have seen Ethyl's "Product Sales Clinic" say that it gives more real sales-building information than anything of its kind. This new show was developed to help you carry out your dealer-education program. Its purpose is to give service station personnel a working knowledge of engines, fuels, lubricants and TBA items.

As you know, dealer education is at best a difficult and laborious task. Textbooks and pamphlets seldom get careful study, even though they are attractively illustrated and diagramed. And you know how during long meetings even the best of upholstered chairs get hard. Men start to fidget and wish themselves out.

We believe one solution to the dealer-education problem is "showmanship."

(*continued on next page*)

ETHYL
ETHYL CORPORATION

## We applied the "strip-tease" principle to dealer education

(*continued from preceding page*)

So in our Clinic we employ basic theatre techniques, one of which is the "strip-tease" principle. Giant models of an engine, a carburetor and a distributor are stripped down to show the how and why of their operations.

Other interest-holding ideas are an unusual use of black light and fluorescent paints . . . dramatic demonstrations of such subjects as knock and oil contamination . . . and a "talking" engine operated on various fuels while big dials tell the different stories of speed, power and heat.

Several units of the "Product Sales Clinic" are now working full time. And plans are being made to expand this service to meet the demands of the industry.

**ETHYL CORPORATION**

**NEW YORK 17, NEW YORK**

*Ethyl service is backed by 28 years of antiknock experience*

FARM SERVICE

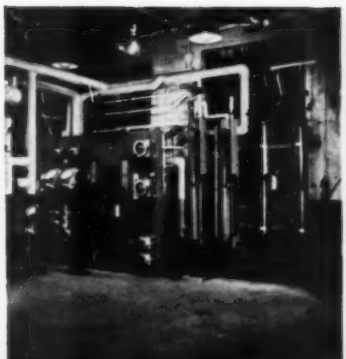
FUEL RESEARCH

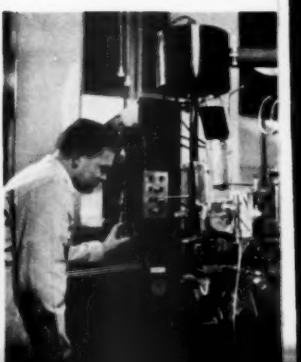
ROAD RATINGS INDOORS

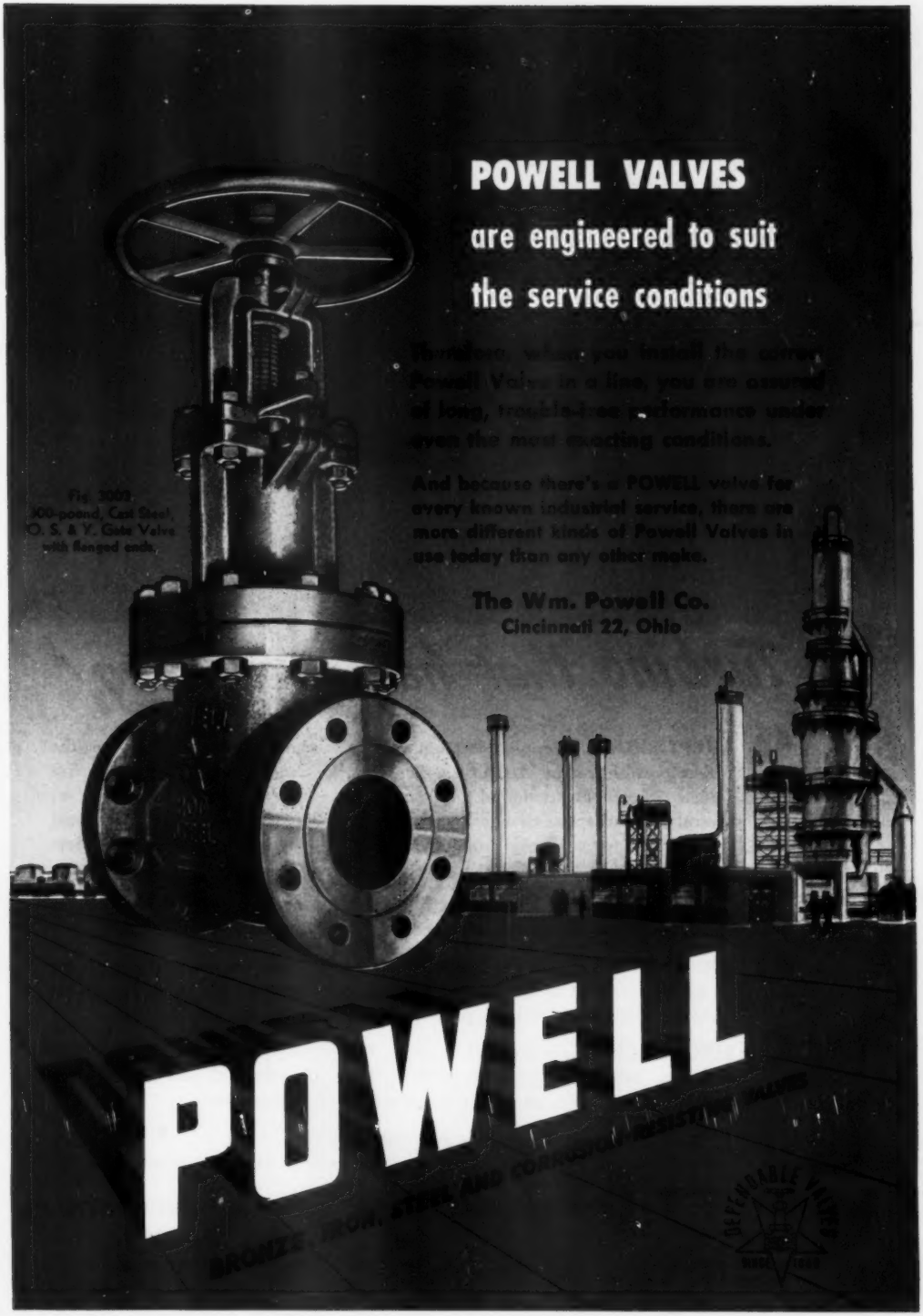
PREMIUM GASOLINE PROMOTION

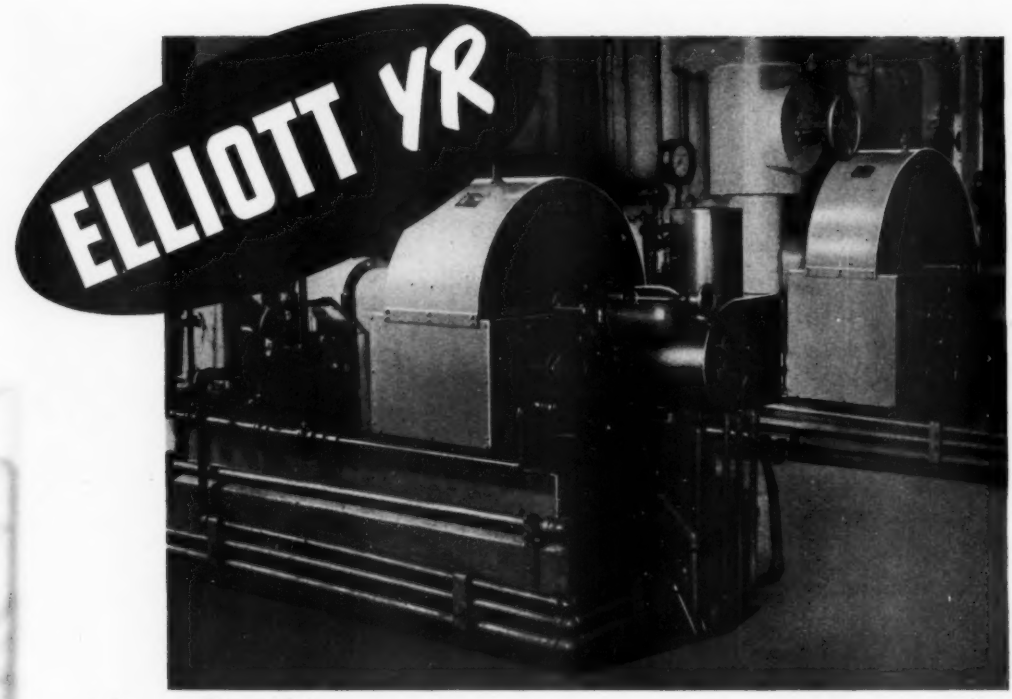
SAFETY SERVICE

GASOLINE TESTING






POWELL VALVES
are engineered to suit
the service conditions
Therefore, when you install the correct Powell Valve in a line, you are assured of long, trouble-free performance under even the most exacting conditions.
And because there's a POWELL valve for every known industrial service, there are more different kinds of Powell Valves in use today than any other make.
The Wm. Powell Co.
Cincinnati 22, Ohio
Fig. 3000
300-pound, Cast Steel
O. S. & Y. Gate Valve
with flanged ends
POWELL
BRONZE, IRON, STEEL AND CORROSION RESISTING VALVES
DEPENDABLE VALVES
SINCE 1846




# the Turbine that has everything!

1. **ADAPTABILITY** — Permissible modifications to standard basic design cover the widest possible range. Actually, eight types of turbines are available on five frames . . . one basic design of governor valve, six elective types of governor . . . several types of speed changer, emergency tripping mechanisms . . . gland seal arrangement for condensing operation and for operation with gas . . . These are just a few of the many available modifications.

2. **RELIABILITY** — Well known as a quality of Elliott turbines, has been further enhanced by improving manufacturing facilities and details of design.

3. **ECONOMY** — First, in the operating saving of a turbine practically built for its specific conditions. Second, in stocking fewer replacement parts due to the interchangeability of wearing parts on all frame sizes.

4. **REPUTATION** — Engineers all know it. As one engineer said to another who had been having drive troubles, "Why don't you put in Elliott turbines and stop worrying?" We can ask for no stronger recommendation.

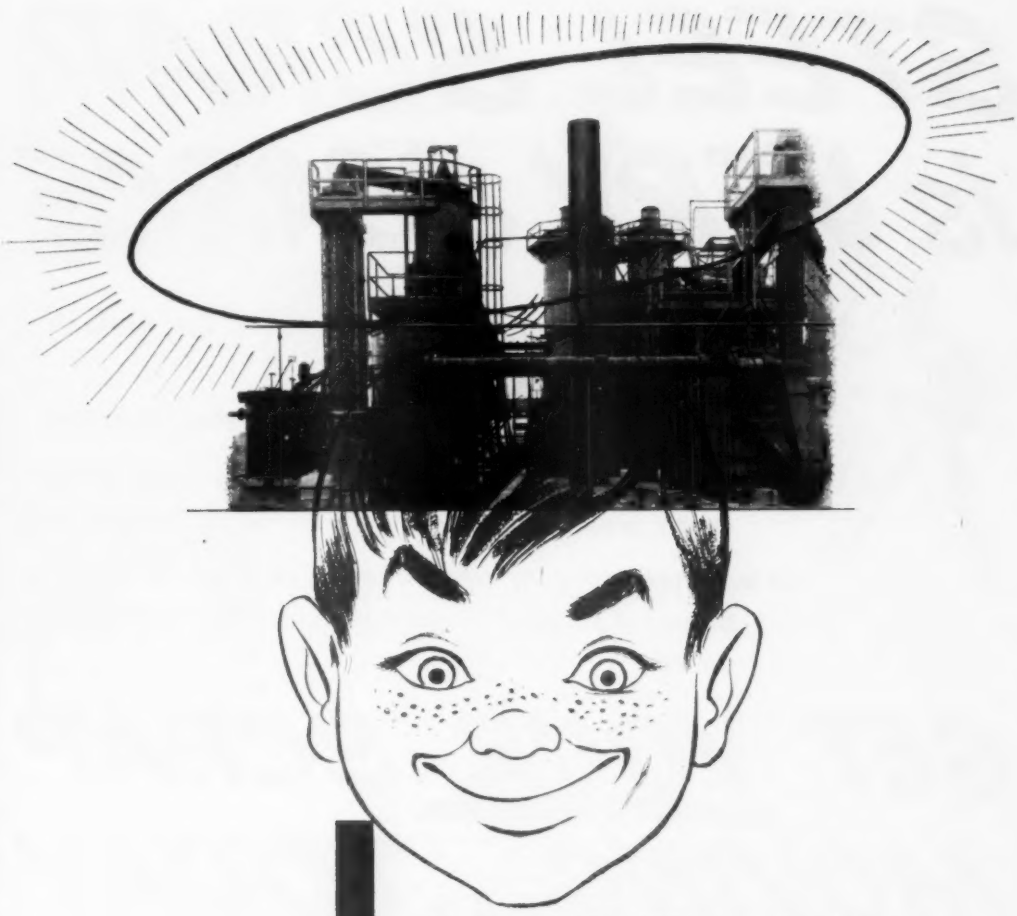
Write us for informative Bulletin H-16.

**ELLIOTT Company** **STEAM TURBINE DEPT., JEANNETTE, PA.**

Plants at: JEANNETTE, PA. • RIDGWAY, PA.
AMPERE, N. J. • SPRINGFIELD, O. • NEWARK, N. J.

H2-1

*DISTRICT OFFICES IN PRINCIPAL CITIES*



# "stepchild" becomes a favorite son

If the refinery waste "stepchild" is an expensive nuisance, change it to a favorite son with a Monsanto-Ross-Wilde sludge recovery unit.

With a Monsanto-Ross-Wilde unit, you can make clean, white sulfuric acid, of any desired strength, from sludge, from $H_2S$, or from both together. The unit will operate with your present contact sulfuric acid plant. If you have no plant, Monsanto will design your sludge recovery and sulfuric acid units as a single project.

In addition to making high-quality sulfuric acid, the Monsanto-Ross-Wilde unit often recovers oil that can be refined into salable products. It can also give you by-product steam for heat or power.

You save money, too. Freight costs of hauling away sludge and returning recovered acid are eliminated. And you improve community relations by doing away with stream and atmospheric pollution.

At your request, and without obligation to you or your company, a Monsanto representative will visit your refinery and estimate the cost of a Monsanto-Ross-Wilde installation. He will show you how much acid you can produce . . . how much you'll save on waste disposal costs. Write, wire or telephone for details. MONSANTO CHEMICAL COMPANY, Engineering Sales Department, 1700 South Second Street, St. Louis 4, Missouri.

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

# STEEL SCRAP is VERY SCARCE

***America's steel industry is essential to the nation's defense.***

***Large quantities of scrap are used by the steel industry.***

***YOU—in your plant or on your property have scrap that's urgently needed.***

***Unless you turn your scrap over to your scrap dealer, the steel so vital to American industry cannot be made.***

# GET YOUR SCRAP MOVING...TODAY

*LOOK FOR THE YELLOW TRIANGLE ON THE REEL*

Wire Rope—sinewy muscle of industry—is one more of the many products of steel upon which America depends for the increased production necessary to meet both civilian and defense demands.

Here, too, your scrap contribution is of vital importance... enabling us to serve you better... helping to provide you with continued, uninterrupted supply.

THE CALIFORNIA WIRE CLOTH CORP.— Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
THE COLORADO FUEL & IRON CORP.— Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
WICKWIRE SPENCER STEEL DIV.— Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) Philadelphia • New York

**WICKWIRE ROPE**

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

**"I MUST KNOW EXACT TEMPERATURES TO MAINTAIN PRODUCT QUALITY."**

**"THE SAFETY OF MY EQUIPMENT DEPENDS ON ACCURATE TEMPERATURE MEASUREMENT."**

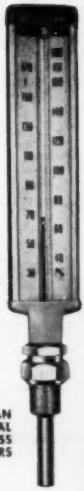
**"IN MY BUSINESS, PRECISE TEMPERATURE RECORDING MEANS PRECISE COST CONTROL."**

You know why accurate temperature measurement is vital in *your* business. You also know it takes skillful engineering, the highest quality materials and workmanship to create consistently accurate, long-life instruments. That's exactly what you get in every American Thermometer and Temperature Indicator and Recorder you buy.

Depending upon type and requirements, these precision instruments are built in ranges from minus 100°F. to plus 3000°F., with actuation by mercury, vapor pressure, gas, bi-metal or thermocouple. For accurate remote indication or recording, up to 250 feet from the temperature source, we can supply famous "Magic Pulse" self-compensating capillary tubing with mercury-actuated temperature instruments. American Temperature Transmission systems are ideal wherever process temperatures must be indicated or recorded at one or more points located at considerable distance from the temperature source.

The complete line of American Thermometers and Temperature Measuring Instruments simplifies selection for specific applications. Write for a copy of our new catalog.

Stocked and Sold by Leading Distributors



AMERICAN INDUSTRIAL GLASS THERMOMETERS

AMERICAN ELECTRONIC TEMPERATURE INDICATORS

AMERICAN RECORDING THERMOMETERS

AMERICAN DIAL THERMOMETERS

1850 AMERICAN U S A

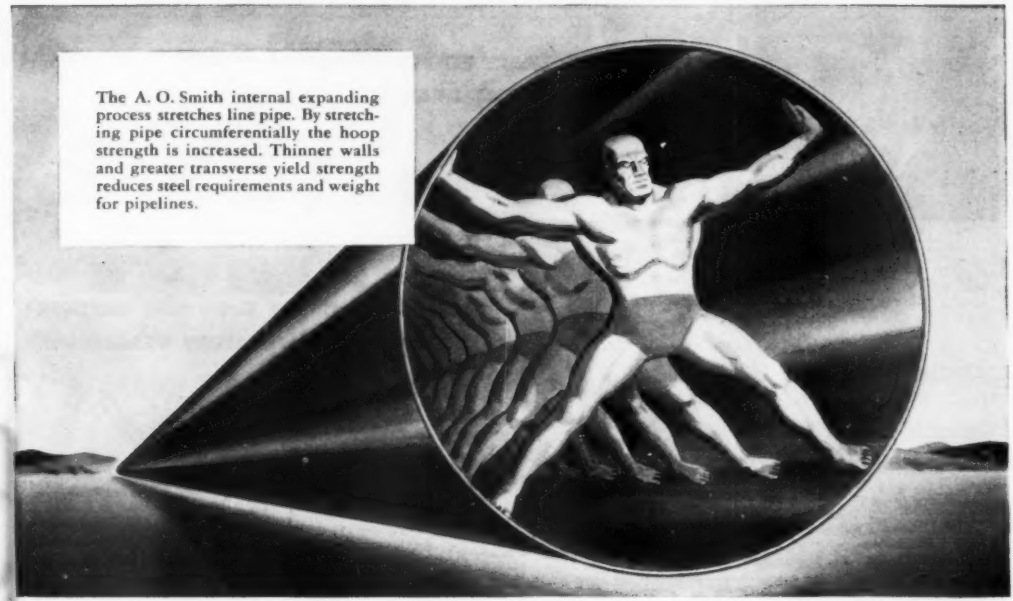
# AMERICAN INDUSTRIAL INSTRUMENTS

MANNING MAXWELL & MOORE INC. TRADE MARK

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES. BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

**FIRST names in pipelines depend on the FIRST* name in line pipe**


The A. O. Smith internal expanding process stretches line pipe. By stretching pipe circumferentially the hoop strength is increased. Thinner walls and greater transverse yield strength reduces steel requirements and weight for pipelines.

# We increase line-pipe Strength and Save Steel

**The internal expanding** of line pipe is a proven process at A. O. Smith Corporation. It has been used on SMITHway Line Pipe since 1930.

**This stretches the pipe,** increasing the circumferential yield strength as much as 30%. Lighter wall pipe can be used for the same operating conditions. Material savings in steel, freight, and field welding costs are obtained.

**In these days** of restrictions on the use of critical materials, of which steel is basic, the A. O. Smith internal expanding process, which assures uniformity of SMITHway Line Pipe, reduces the tonnage of steel required for any given pipe line.

**Through its application** of new and sound engineering design and developments in the manufacture of large diameter pipe, A. O. Smith is recognized as the leader in this field.

*FIRSTS by A. O. Smith • Welded line pipe • Internal expanded pipe • Light wall large diameter pipe • World's largest producer of large diameter welded steel pipe.

**DEPENDABILITY** *through* **RESEARCH** *and* **ENGINEERING**

A. O. Smith 78th ANNIVERSARY 1874 - 1952

**A.O.Smith**

**LINE PIPE • CASING**

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**Los Angeles 22 • Midland 5, Texas**
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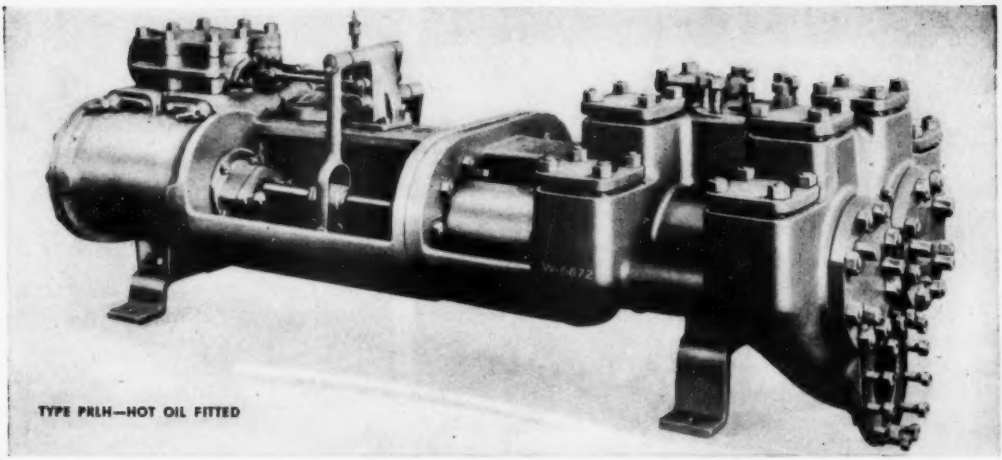
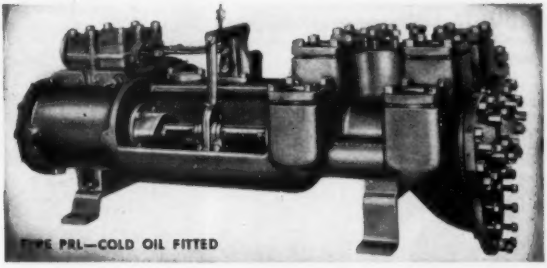


TYPE PRLH—HOT OIL FITTED

## We've Built New and Superior Strength into

# Worthington Steam Pumps



TYPE PRL—COLD OIL FITTED

### NEW STEAM ENDS RATED UP TO 250 PSI

Steam cylinders and flanges designed for 250 psi maximum working pressure hydrostatically tested to 375 psi . . . Drop-forged steel steam valve gear . . . Heavier piston rods . . . ½ in. minimum drain openings allow heavier pipe connections . . . Those are some of the *strength features* built into Worthington's new line of steam pumps for refinery service.

### MORE FEATURES OF ADVANCED DESIGN

Then, for *longer wear*, the steam valve gear is lubricated—oil cups on the rocker arms give longer bearing life.

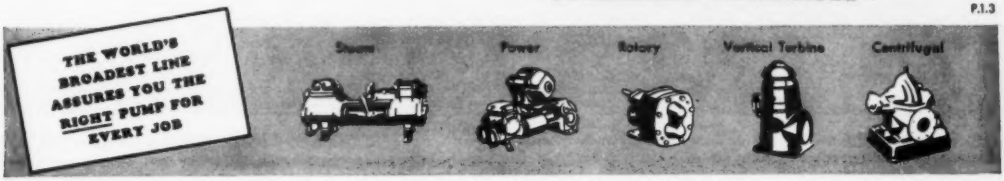
And *accessibility:* two-piece piston rods, either part removable without disturbing the other end . . . flanging on steam cylinder permits easy lagging . . . external cushion valves (on larger sizes).

This new line of duplex steam pumps represents Worthington at its best—the broadest range, the finest engineering. It's one more proof that *there's more worth in Worthington*. For information about specific pumps, write Worthington Pump and Machinery Corporation, Reciprocating Pump Division, Harrison, New Jersey.

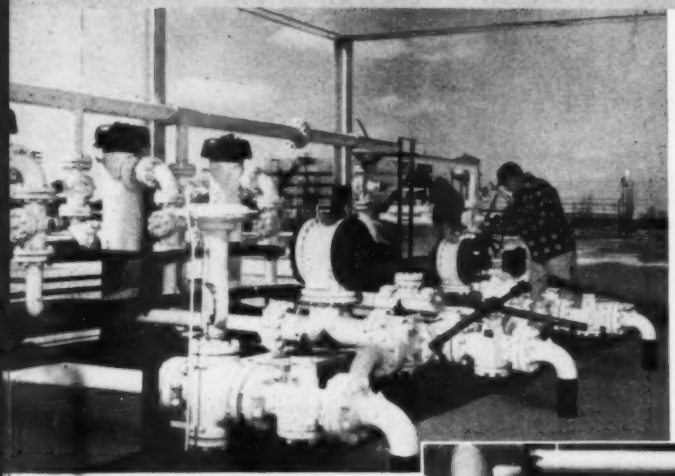
**WORTHINGTON**

P.1.3

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

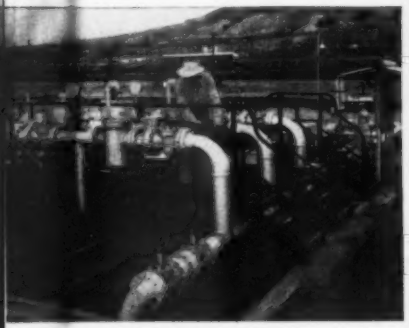


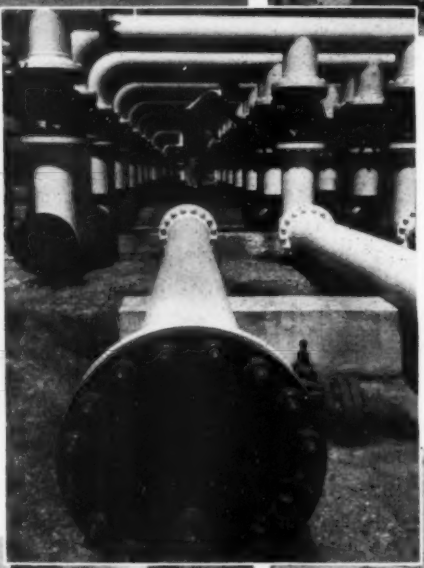
# *On* GAS, CRUDE OIL *or*



**PRODUCTS LINE**— Nordstrom valves and Rockwell built Pittsburgh Rotocycle meters at pumping station in Zionsville, Ind.

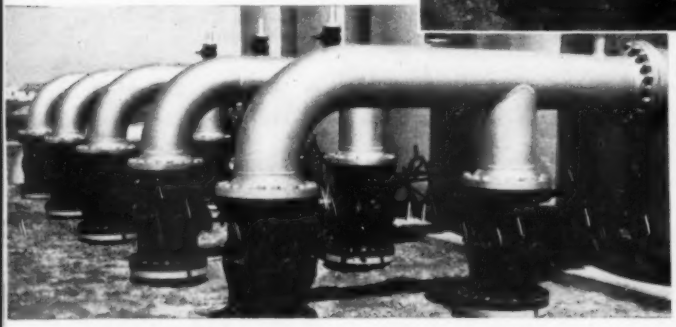
**PRODUCTS TERMINAL**— In East Chicago, Ind., is one of the largest products line terminals in the world, and in it there are over 1000 Nordstrom valves. This is one Nordstrom-equipped manifold.

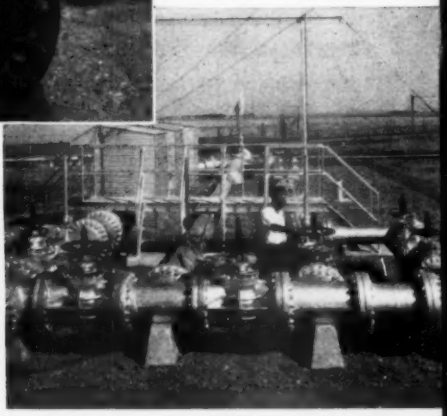




**LOUISIANA CRUDE OIL LINES**— Nordstrom gear operated valves guard this Louisiana crude oil pipe line manifold.

**CRUDE OIL MANIFOLD**— At the end of crude oil line from Rangely Field in Colorado to North Salt Lake, Utah, is this Nordstrom controlled manifold.



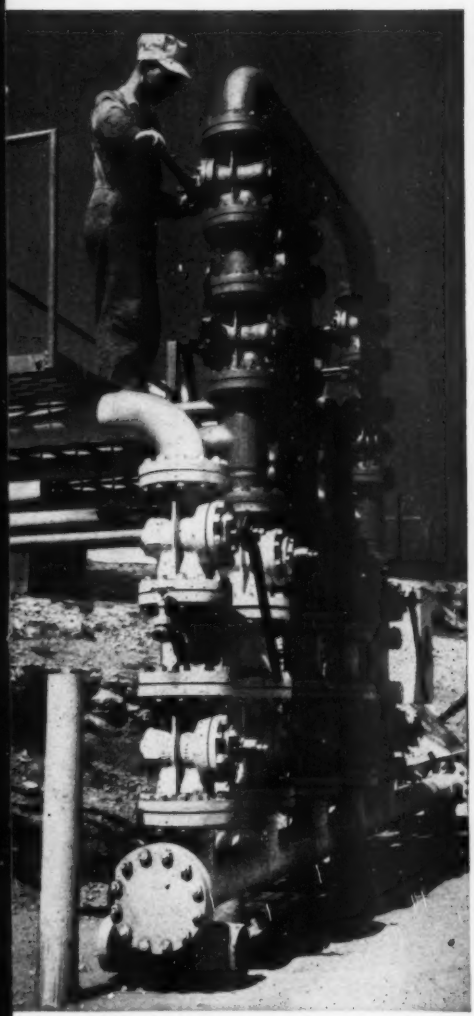


**GAS SCRUBBERS**— Installed on gas scrubbers at Hugoton, Kans., compressor station are these Nordstrom gear operated valves.

**GAS LINE METERING STATION**— These Nordstrom valves have been in continuous service for more than 20 years in a California gas pipe line regulating and metering station.

# PRODUCTS PIPE LINES...

## 30-YEAR RECORD SHOWS NORDSTROM VALVES BEST FOR SAFETY, TIGHT SHUT-OFF, SURE OPERATION



**PRODUCTS INTAKE**— Feeding a 6-inch products pipe line from Borger, Tex., to La Junta, Col., is this vertical intake manifold. Five lines, each carrying a different product, come into the manifold.

No valve has been so thoroughly tested in pipe line service as Nordstrom. The first Nordstrom pipe line valves were developed in the early twenties. Before that, few gas pipe lines carried high pressures. Most crude was rail-shipped. Product lines were yet to come.

In the 30 years since, Nordstrom has built valves for virtually every phase of pipe line operation and for nearly every major pipe line in America.

For America's spreading network of pipe lines —gas, crude and product—Nordstrom builds a full range of sizes and types . . . manually operated, or with automatic controls for remote operation . . . round opening up to 10-inch sizes . . . steel, semi-steel, Merchrome hard-faced or special alloy valves . . . pressures up to 10,000 lb.

In any pattern, time-tested Nordstrom pipe line valves mean an extra degree of safety, an extra assurance of dependability for emergency closing, extra insurance against leaks. There is no substitute for experience—certainly not in pipe line service.

Another ROCKWELL Product

**Nordstrom Valves**

Lubricant Sealed to Keep Upkeep Down

**Rockwell MANUFACTURING COMPANY**

*400 N. Lexington Avenue, Pittsburgh 8, Pennsylvania*

Many Nordstrom pipe line valves installed 30 years ago are still in service after 30 years. Example: Nordstrom valves installed in 1921 in the San Jose-Los Gatos, Calif. pipe line in 1921, recently examined, and apparently as good as the day they were put in the line.

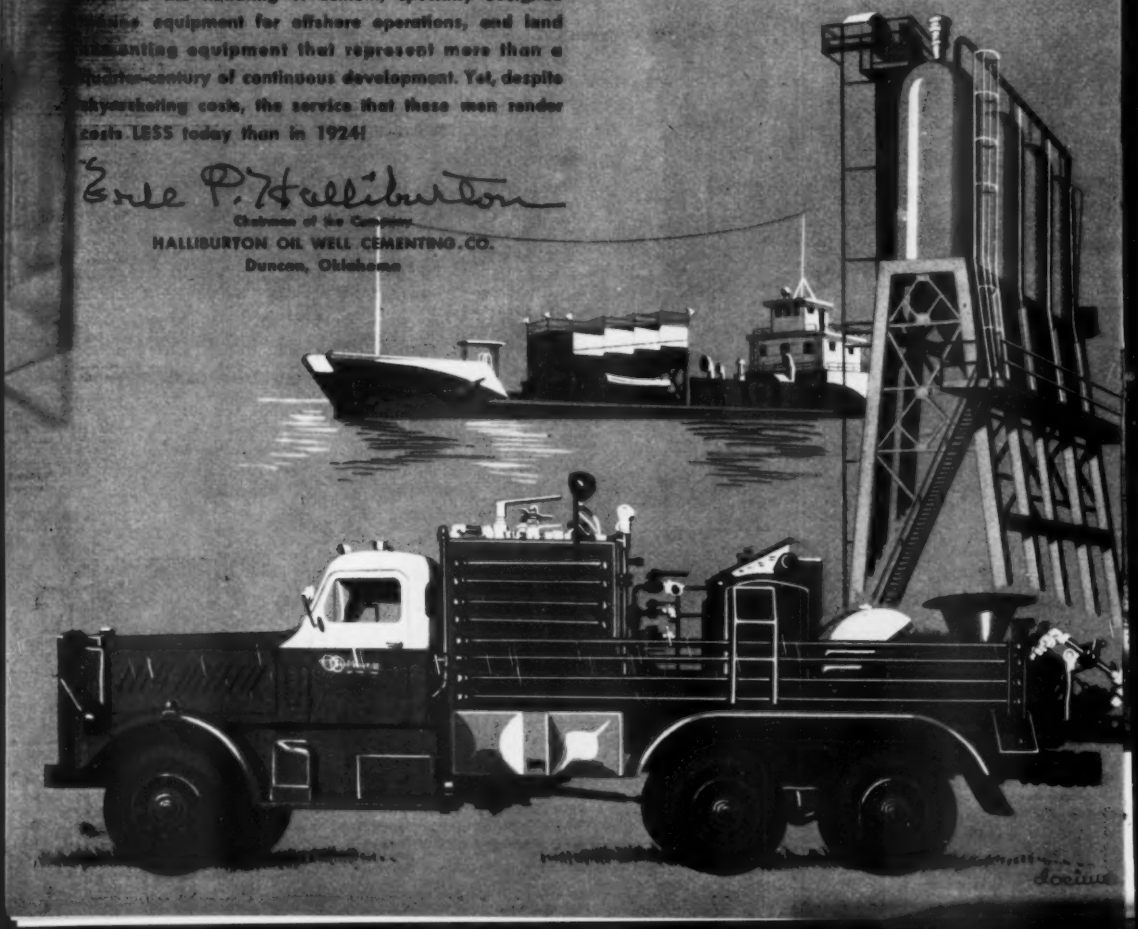
# SINCE 1924 CONSTANT IMPROVEMENT IN

- EQUIPMENT
- METHODS
- FACILITIES

[illegible] proud, and had reason to be, of the Howco [illegible] of 1924. "We'll Get There Somehow" was their slogan, and somehow they always did. The Howco [illegible] of 1952 are cut from the same cloth, but infinitely better equipped—with modern bulk plants to speed and improve the handling of cement, specially designed [illegible] equipment for offshore operations, and land [illegible] equipment that represent more than a quarter-century of continuous development. Yet, despite skyrocketing costs, the service that these men render costs LESS today than in 1924!

Erle P. Halliburton

Chairman of the Company
HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Oklahoma



**Koppers K-Spun Rings**

Manufactured in diameters up to 12½" by Koppers exclusive centrifugal casting process. 100% stronger, 4 times more resistant to combustion shock than ordinary rings. Will not break in installation or for the life of the engine. For high-speed diesels and other applications where extreme strength is needed.

**Koppers Lug Seal Rings**

A specially designed two-piece ring for use on badly out-of-round and tapered cylinders, or on pistons with worn grooves. Maintains compression at a high level, prevents blow-by, provides highly efficient oil control.

**Koppers Porous Chrome* Rings**

Porous Chrome surface holds and distributes oil during break-in, quickly wears to perfect seating. Combined with K-Spun metal in sizes up to 12½" dia. Last up to 4 times as long as other rings, cut cylinder wear up to 50%. Designed for top compression rings of high-speed engines.

** Van der Horst Process*

# Here's why Koppers offers you piston rings in every size, of every type, for every purpose

**Koppers Seal Rings**

Specially designed ring with a projecting bronze band that causes a burnishing action on cylinder walls. Decreases scuffing and wear on cylinder walls of gas and diesel engines, air and refrigeration compressors and many other applications.

**Koppers Step-Seal Rings**

Designed especially for applications where blow-by is a serious problem. Combines the strength of a single-piece ring with the sealing qualities of a multiple-piece ring. For use on hydraulic presses and diesel and other internal combustion engines.

**Koppers Oil-Cutter Rings**

Exceptional oil control is attained by unique design . . . 2 bevels for riding over oil on upstroke, 2 scraping edges for taking excess oil from cylinder walls on downstroke, plus a series of wide drainage slots. For use on high-speed, 4-cycle engines.

*These are a few of the hundreds of rings manufactured by Koppers.*

EVERY piece of equipment presents a different piston ring problem. Koppers, with its wide variety of rings for every conceivable use, provides the solution to *all* industrial and automotive ring problems.

Our engineers, who work with you in determining the best rings for your applications, have all the facilities of the large, modern Koppers piston ring plant at their disposal . . . to supply you with the rings that will cut down-time, increase efficiency and lengthen the life of your equipment.

No matter what kind of equipment you have . . . railroad, stationary or marine diesels, aircraft or automotive engines, pumps, compressors, steam hammers, hydraulic presses . . . if it uses piston rings or sealing rings, write, wire or phone us today for experienced help with your piston ring problems. Koppers Company, Inc., Piston Ring Dept., 1552 Hamburg St., Baltimore 3, Maryland.

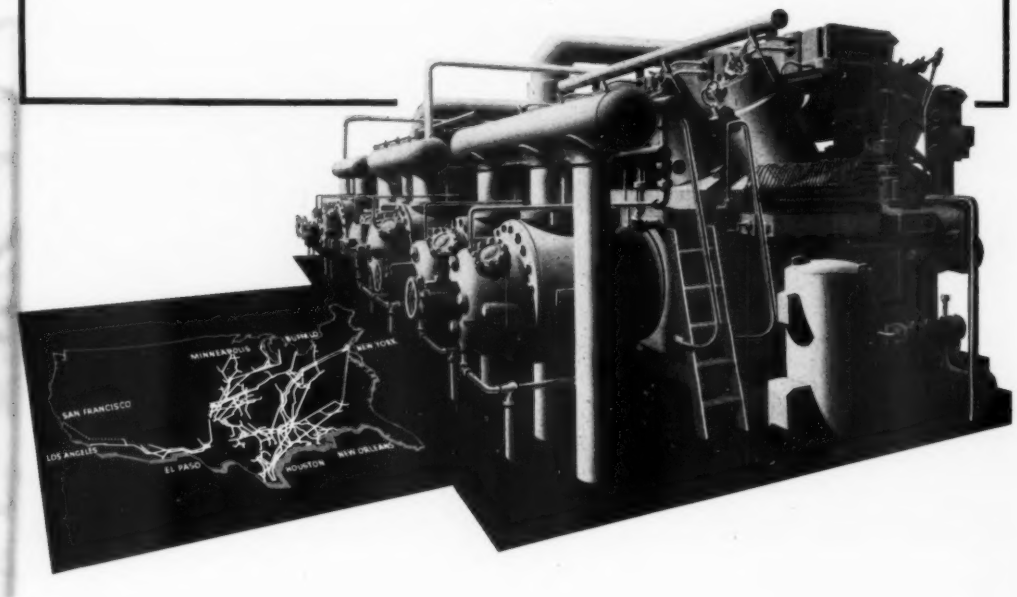
KOPPERS ®

**KOPPERS** *Only KOPPERS can furnish K-Spun or Porous Chrome!*

**AMERICAN HAMMERED PISTON RINGS**

# GULF SECURITY OIL

provides better lubrication
for pipe line compressor units,
helps prevent operating troubles




Here's the lubricant you can depend on to help keep your pumping stations operating smoothly and continuously—Gulf Security Oil. It provides effective protection for cylinders and bearings in both engines and compressors.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without any appreciable change in its original properties. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings. And because oil control rings are kept clean, oil consumption is remarkably low.

Operators of the many units lubricated with Gulf Security Oil report that this quality lubricant helps them get more operating hours between overhauls, and avoid unscheduled shutdowns.

For additional information on Gulf Security Oil and for the services of a Gulf Lubrication Engineer, get in touch with your nearest Gulf office today. Write, wire, or phone.

Gulf Oil Corporation · Gulf Refining Company,
Gulf Building, Pittsburgh 30, Pennsylvania.

GULF INDUSTRIAL LUBRICATION

# MINNEAPOLIS-MOLINE

## oilfield engines

Minneapolis-Moline natural gas engines are today the most economical type of pumping power available in the oilfield. Extensive oilfield experience is embodied in their design with all parts of heavy construction to withstand peak stresses produced in pumping operations. Internal engine cleanliness, so essential to long trouble free operation, results from water jacketed base pan which maintains constant 175° lube oil temperature and maximum cleaning action of oversized oil filters.

Operated in conjunction with a properly designed gas scrubber at recommended loads and speeds these engines with a minimum of servicing can be counted on to give years of continuous trouble free operation. Complete details are contained in new engine catalog which will be mailed on request.

**MINNEAPOLIS-MOLINE**
**MINNEAPOLIS 1, MINNESOTA**

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**SHRIMPTON**
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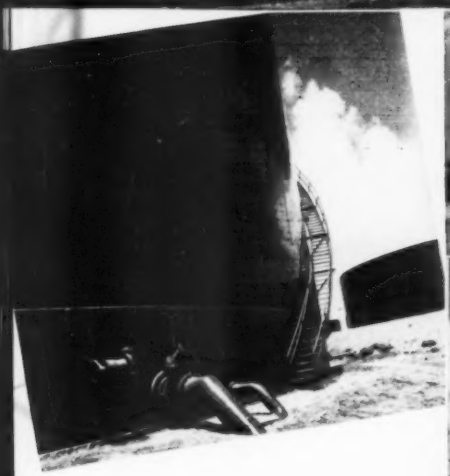
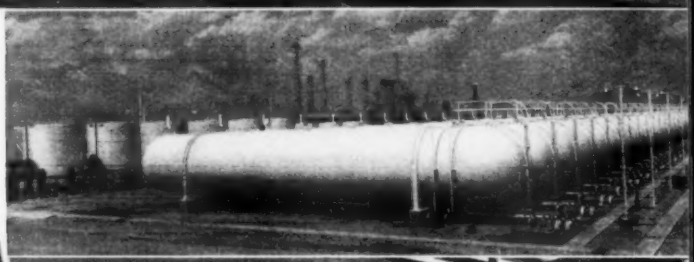
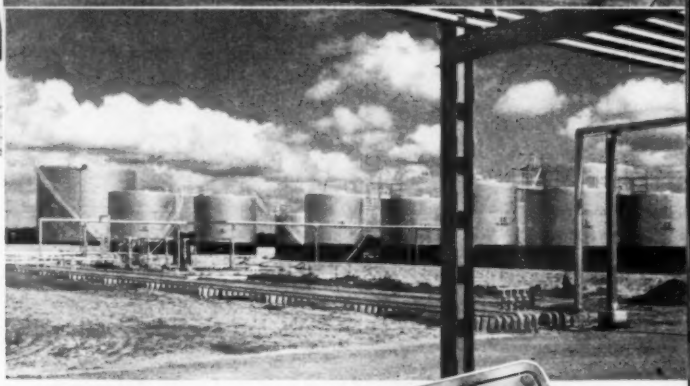






- Fabricators and Erectors of Dependable Steel Storage for a third of a Century. . . . Any type. . . . Any size. Anywhere. . . . Cut-down and re-erection of old rivited storage.

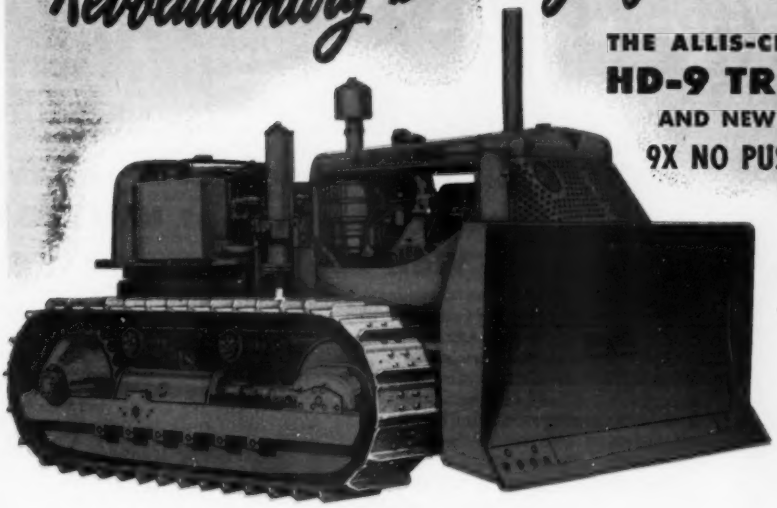
STEEL PLATE FABRICATORS AND ERECTORS SINCE 1913

Wyatt's
HOUSTON-DALLAS-NEW YORK-TULSA

NOW!

# Revolutionary Bulldozing Performance

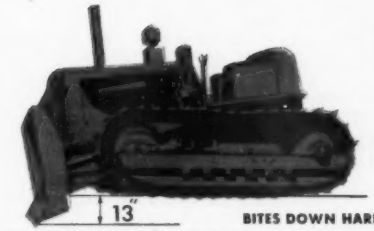
## THE ALLIS-CHALMERS HD-9 TRACTOR AND NEW BAKER 9X NO PUSH-BEAM DOZER



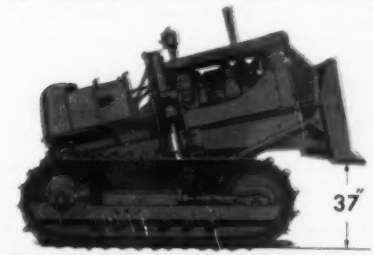
- 8- FT. HIGHWAY WIDTH BLADE No Transport Permit Needed
- 72 Drawbar Hp. Weight with Dozer — 21,500 lb. Speeds: 6 forward, 3 reverse

This major bulldozer design improvement brings you new dirt-moving capacity for slush pit digging . . . new portability for highway transport . . . new low original cost . . . new ease of servicing and operator comfort.

Here's what makes this team the most productive combination for oil field work:




**BITES DOWN HARD** Full 13-in. drop below ground, positive down pressure plus steep angle of penetration means fast digging.




**HIGH LIFT** — Full 37 in. above ground. Excellent for pushing over trees and stumps and clearing brush.

**A GREAT NEW TRACTOR.** This new Allis-Chalmers HD-9 Tractor has power, weight and balance that puts it in a class by itself — never such traction . . . such pushing and pulling ability.

**A REVOLUTIONARY TEAM.** Here is a tractor-dozer combination designed together as a unit, which compares in performance with conventional "dozers" weighing from five to six thousand pounds more.

**NO PUSH BEAMS.** A completely new idea in bulldozer engineering, the 9X blade is mounted directly to the HD-9 main frame. Tractor main frame and dozer are raised and lowered as a single unit.

**LIGHTER WEIGHT — BETTER STABILITY.** Almost 1,150 lb. lighter than standard dozer. Costs less to buy. And with lighter blade mounted 15 inches closer, tractor center of gravity is not upset. No excess wear on front truck wheels and support rollers.

**BIG DIRT MOVER.** Because of extra clearance, greatly increased track oscillation and better balance, this team is a phenomenal performer in mud and tough going. And with blade fully six inches higher, capacity is kept on par with conventional blade.

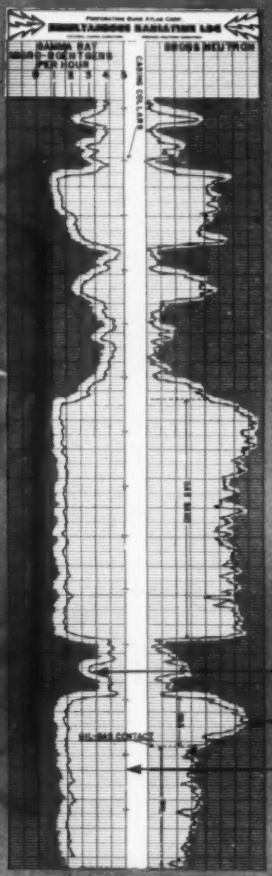
**SIMPLIFIED SERVICING.** 1,000-hour lubrication of truck wheels, idlers and support rollers. Dozer mounting does not interfere with engine accessibility. No removal of major tractor assemblies. Hinged grill swings out for easy access to dozer hydraulic pump, or to clean radiator core.

**EASY TO OPERATE.** Just by pulling a single lever, operator can shift from any of the six forward speeds to any of the three high speed reverses. This, plus narrow, frame-mounted blade makes the HD-9 particularly fast and maneuverable. With no spring deflection, blade responds immediately and positively to control levers.

**ALLIS-CHALMERS**
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

# You've read some wild "mumbo jumbo" lately on RADIOACTIVITY LOGGING—

# NOW, Let PGAC TAKE YOU BEHIND THE SCENES




Another example of PGAC's clear definition and interpretive qualities; this interpretation was subsequently verified. This log *(below 10,000 ft.)* is an exact reproduction of the original recording. Notice the perfect absence of *"temperature drift."*

## HERE are some of the "unmentionables" about NEUTRON Well Logging!

The outstanding advantages of SIMULTANEOUS RADIATION LOGGING, a method *exclusive* with Perforating Guns Atlas Corporation, have been *proved* by many leading oil companies and countless independents. Competitive tests on the same holes have *repeatedly* proved:

1—PGAC's superiority in log *accuracy*

2—PGAC's superiority in log *stability* —"repeatability"

3—PGAC's superiority in *reliability of log interpretation*

4—PGAC's *savings of 60% in rig down-time* for logging

### NOW . . . let's see Why this is true

Perforating Guns Atlas Corporation developed the world's first—*and uses the world's only*—SIMULTANEOUS RADIATION LOG . . . which simultaneously records:

A—a Gamma Ray curve—*with quantitative calibration* indicating microroentgens per hour

B—a "pure" *Neutron/Neutron* curve—absolutely unaffected in any way by Gamma Rays of any kind

C—a positive depth indication—by a supersensitive and accurate locator for pipe collars or flush joints

And all three of these PGAC records are made from a single instrument *on a single trip in the hole.* They are thereby *absolutely interlocked* and *automatically correlated* . . . whereas every competitive log attempting to determine similar data, must be separately recorded on at least two trips in the hole—and then must be correlated for depth relationship by superimposing and adjusting the separate recordings, with the ever-present possibility of human error.

PGAC, and only PGAC, completely eliminates such possibility of human error with its *exclusive* method of SIMULTANEOUS RADIATION LOGGING. And because all three records are simultaneously produced *on one chart,* no correlation is necessary; so the *relationship* of these phenomena by the PGAC method is automatic; positive, and absolutely accurate.

### Here are FACTS you can understand

As you know, Neutron well logging is accomplished by lowering into the hole an instrument containing a Fast-Neutron source for bombarding the formation being logged, and a detector for recording the results of that bombardment. Essentially, the Fast-Neutron sources are all similar, but the detectors used are of two entirely different types.

Only Perforating Guns Atlas Corporation uses the "pure" *Neutron/Neutron* method of detection for the Neutron curve (B, above). For this purpose, PGAC uses a *Slow-Neutron* counter to detect the Slow-Neutron radiation resulting after the Fast-Neutron has bombarded and traversed the formation being logged. And because this counter will not respond to *anything* but Slow- Neutrons, the PGAC Neutron Log is a true curve *entirely unaffected* by certain detrimental Gamma Rays. These detrimental Gamma Rays are present and are recorded in all competitive methods—due to the fact that all competitive methods are dependent upon the Neutron/Gamma method of detection.

Remember, only PGAC can use the *Neutron/Neutron* method, upon which the ever-present Gamma Rays have no influence.

### Neutron/Neutron VS. Neutron/Gamma Logging

All radioactivity logging *except that done by PGAC,* is dependent upon the


## PERFORATING GUNS ATLAS CORPORATION

General Offices and Main Plant: 3915 Tharp Street, Houston 3, Texas, Telephone: PReston 4351

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ALICE, TEXAS, Phone: 713 or 410 - VICTORIA, Texas, Phone: 1023 - CORPUS CHRISTI, TEXAS, Phone: 3-1324 - ODESSA, TEXAS, Phone: 6-6429 - LONGVIEW, TEXAS, Phone: 4905 - OKLAHOMA CITY, OKLA., Phone: 2-5342 - PAULS VALLEY, OKLA., Phone: 1577 - SEMINOLE, OKLA., Phone: 2938 - GREAT BEND, KANSAS, Phone: 4306 or 4307 - HOBBS, NEW MEXICO, Phone: 900-W - SHREVEPORT, LA., Phone: 3-1648 - LAKE CHARLES, LA., Phone: 4724 - LAFAYETTE, LA., Phone: 8-3495

Canadian Affiliate: PERFORATING GUNS OF CANADA, LTD., Edmonton, Alberta, Canada

# EVERY OIL MAN SHOULD READ THIS EXPOSE'

**an understanding of oilfield atomic energy in 5 minutes reading time**

You can't fool all of the people all the time . . . not even with wild claims. So, let's call a spade *a spade!* Let's see why these wild claims are never supported by some plain, honest-to-goodness, understandable *facts* on the science of atomic energy as employed in well logging. Then, *you* be the judge!

use of a small ionization chamber to obtain the so-called Neutron Log (but which, actually, is a Neutron/*Gamma* Log) . . . whereas PGAC enjoys patent protection in the *exclusive use* of the afore-mentioned Slow-Neutron counter to obtain a "pure" Neutron/Neutron log.

The ionization chambers used in all competitive Neutron logging, are responsive only to Gamma Rays of various types—not to Neutrons of any type. Neutron/Gamma Logs are intended to reflect the detection of *secondary* Gamma Rays-of-capture ONLY (which result from Neutron bombardment of the formation being logged) . . . and it should be remembered that this *secondary* Gamma radiation is the only phenomenon which can be utilized by competitive methods to obtain their Neutron/Gamma logs. It is a scientific fact, however, that the logging of this one phenomenon *alone* is utterly impossible, because two other phenomena are *always* present—and these other two are decidely detrimental to obtaining an accurate Neutron curve.

The first of these two detrimental phenomena is the *natural* Gamma radiation from the formation being logged. Under normal logging conditions, this *natural* Gamma radiation may be of low magnitude and not present too much of a problem. However, many instances are known where strong *natural* radiation from the formation being logged could overshadow the vital *secondary* Gamma radiation and cause an erroneous log.

The second detrimental phenomenon is the strong, scattered, *primary* Gamma radiation which results from the Neutron source itself, simply because there is always a very strong radiation of Gamma Rays present in the bombardment source. To prevent this strong *primary* Gamma radiation from completely blocking out the *secondary* Gamma radiation — from which the log must be obtained — all competitive Neutron logging instruments are forced to use a shielding between the Neutron bombardment source and the ionization chamber obtaining the phenomenon. And right here another crux of the problem arises!

Due to the necessarily limited diameter of the logging instrument lowered into the hole, it is impossible to effect *complete* shielding between the Neutron source and the ionization chamber. Consequently, Neutron/Gamma curves recorded under all competitive methods are affected by this detrimental *primary* Gamma radiation to a greater or lesser extent, *depending upon variations in the size of the bore-hole,* as well as upon other conditions encountered therein. Therefore, and naturally enough, the Neutron/Gamma curve may lack clear definition, and the interpretation of the faulty curve may reflect conditions inconsistent with the true formation facts.

### Reasons for PGAC's *Pin Point Accuracy*

Since the exclusive PGAC Slow-Neutron counter is not responsive to Gamma Rays *of any type,* no shielding against them is necessary. And since the PGAC counter is not responsive to Fast-Neutrons either, no shielding is even required against the Fast-Neutrons that may go from the bombardment source directly to the counter. With only those Neutrons which have been slowed down by traversing the formation being detected by the PGAC counter, *the reason* for the clear definition and superiority of our Neutron/Neutron curve becomes obvious.

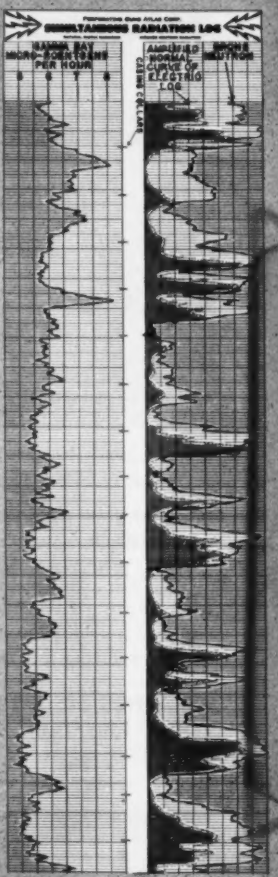
Because of these many exclusive PGAC features, no other radioactivity log can possibly equal PGAC's SIMULTANEOUS RADIATION LOG. And remember too, only the Perforating Guns Atlas Corporation offers this proved superiority in *Accuracy, Stability, Reliability, and Economy.*

So, play it safe . . . always call in PGAC to run a Radiation Log on your well — you'll get a better log, better service — and you'll save 60% of your rig down-time!

**PGAC Automatic Correlation - like marriage — Sure Prevents Human Errors!**

## AUTHENTICATION!

Substantiation of these *behind-the-scenes* facts may be found in the new technical volume, "Principles of Petroleum Geology," by Wm. L. Russell, Associate Professor of Geology at Texas Agricultural & Mechanical College. Any additional data you desire may be obtained without obligation by writing PGAC for answers to your specific questions.




Another example of PGAC's outstanding correlation (of a Neutron/Neutron curve with the electrical log) in an area where, previous to PGAC's Simultaneous Radiation Logging, correlation was very difficult — if not impossible.

# PERFORATING GUNS ATLAS CORPORATION

General Offices and Main Plant: 3915 Tharp Street, Houston 3, Texas, Telephone: PReston 4351

**OIL FIELD SERVICES BY PGAC**

Simultaneous Radiation Logging, Gamma Ray Logging, Brons Neutron/Neutron Logging, Electrical Logging, Jet Shot Perforating, Bullet Perforating, All Wire Line Services, 24-Hour Service From All Stations

Canadian Affiliate: PERFORATING GUNS OF CANADA, LTD., Edmonton, Alberta, Canada

# PUSHING EAST TOWARD CUSHING

## goes another Republic Electric Weld Pipe Line...281 miles long

*Uniformly round, uniform in wall thickness, uniform in diameter,* Republic Electric Resistance Welded Line Pipe goes together fast.

It carries pressures safely because of its *uniform high yield strength.*

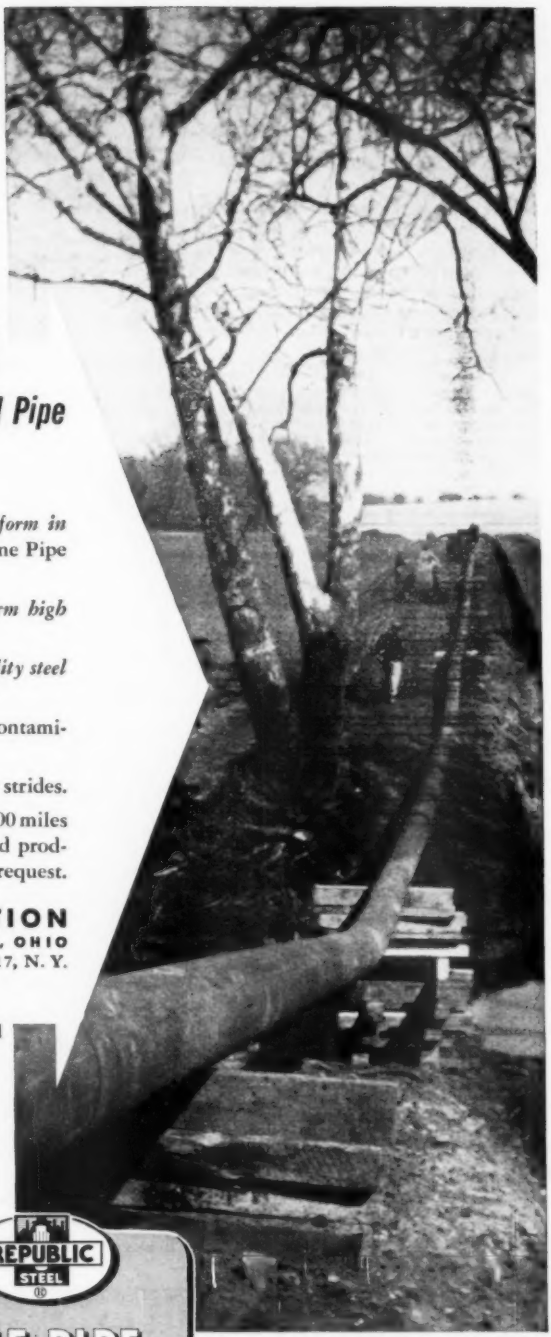
It bends easily because it is made from *high ductility steel* . . . *welds readily* because carbon content is low.

It is *free from scale* that might clog valves or contaminate products.

It comes in *long lengths* that move jobs in bigger strides.

And, it's proved dependable by the more than 63,000 miles used for transmission, distribution, collecting and products lines during the past 23 years. Literature on request.

**REPUBLIC STEEL CORPORATION**
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.



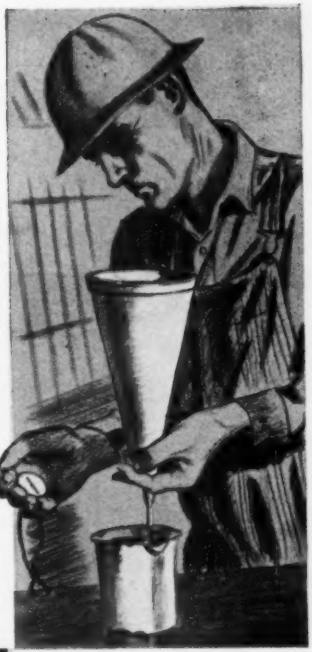
*This Phillips Petroleum Company products line between Phillips, Texas, and Yale, Oklahoma, is constructed entirely of 10¾" Republic Electric Resistance Welded Line Pipe.*

**Republic**
**ELECTRIC WELD LINE PIPE**

REPUBLIC STEEL

**Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes**

# FOR SAFE MUD CONTROL...



**When your drill pipe starts to stick—whenever you face a drilling emergency that can be controlled by skillful mud handling—it's good to know your GARDNER-DENVER SLUSH PUMP has the strength—and to spare.**

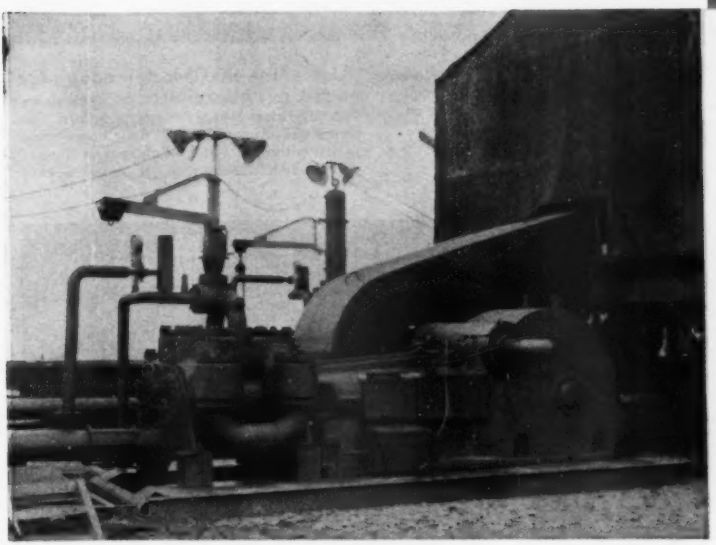
**That's because of—**

***Extra tough fluid end***—Gardner-Denver alloy high pressure cylinders—every cylinder tested to pressures far above those met in use. Divided cylinder construction.

***Improved liner packing***—"telltale" construction reveals leakage before any damage occurs.

***Extra precautions*** keep all mud, water and dust out of the power end—dust-proof cover—improved piston rod packing—rod flushing pipe—rubber piston rod baffle—mud-stop and oil-stop heads.

***Plus:*** One-piece main frame, exclusive rigid main shaft, eccentric construction, herringbone gears, and automatic lubrication with continuous bath of clean, filtered oil. Made in NINE sizes, from 15 h.p. to 750 h.p. Write today for complete specifications.



**Gardner-Denver Slush Pumps are designed to save maintenance time, too!**

**Divided fluid cylinders simplify replacement—can be welded.**

**Exceptionally accessible—liners, pistons and rods can be changed without opening crankcase.**

**Individual valve pot covers permit quick inspection or replacement of any valve.**

**These, and many other features, speed maintenance in the field.**

SINCE 1859

# GARDNER-DENVER

**Gardner-Denver Company, Quincy, Illinois**
**In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario**
**THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS**

Dallas • Houston • Tulsa • St. Louis • Los Angeles • San Francisco • New York
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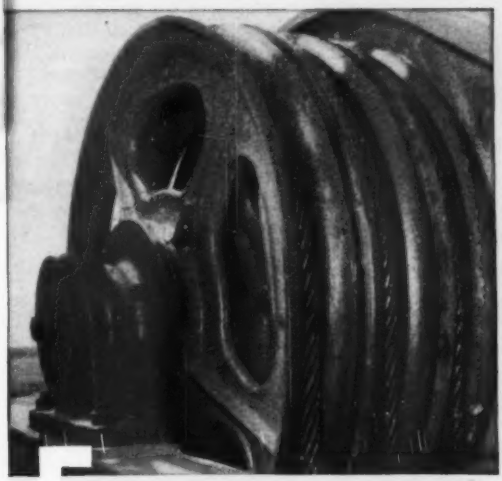
Continental Supply Co., Continental Bldg., Dallas, Texas
Export Division: 30 Rockefeller Plaza, New York, N. Y.
Republic Supply Co., (Of Calif.), 2600 S. Eastland Ave., Los Angeles, Calif.

# Six ways to put more life

**Don't use a line that's too small.** It will wear out faster and cost you more per ton mile than the correct size of line. For deep drilling the 1¼" line is common and some drillers are trying 1⅜" lines with good success.

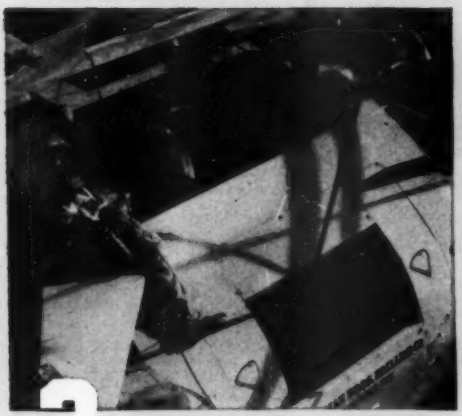
**Use a line that's long enough for a few cut backs.** Wear and fatigue are usually most severe at certain points. The removal of short lengths distributes these destructive forces over different sections of the line and results in much longer service.



**Avoid badly worn sheaves.** Smooth sheaves with full-sized grooves increase wire line life.

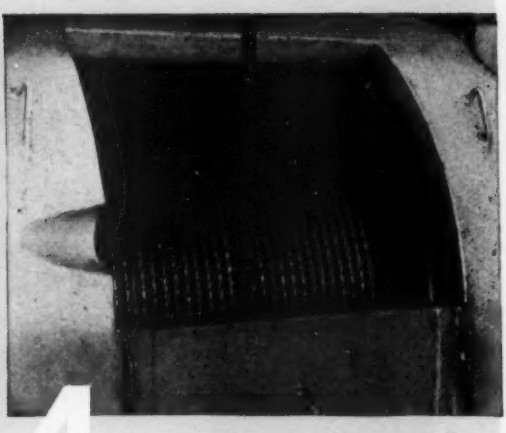
**Don't speed.** It causes excessive vibration and danger of cross winding on drums.

# into your wire lines



3

**Reverse the ends.** Wear from sheaves and fatigue from vibration can be distributed more evenly by turning the line end for end.



4

**Don't neglect lubrication.** We shouldn't have to remind an oil man about lack of lubrication, but this is still a common cause of wire line failure. A 6 x 19 wire line has 115 moving parts—each sliding on the others. If you think of a wire line as a machine—like your automobile—you will lubricate it more often. American TIGER BRAND Lines come from the factory thoroughly lubricated with "Tiger-Lube," the finest wire line lubricant available. But even this dissipates in time and the wire line needs to be re-lubricated before it is too late.

In spite of all these "pitfalls" a reasonable amount of care and maintenance will assure long service life from your TIGER BRAND Lines. They are made of the toughest steels and are properly built to do the job for which they are designed and intended.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

## AMERICAN TIGER BRAND WIRE LINES

*Excellay Preformed*

UNITED STATES STEEL

# How to Effect Temperature Change

## *in Heat Exchangers*

## *Most Efficiently*

This simple diagram shows the difference between the flow of liquid over Wolverine Trufin* as compared to the flow over plain tube.

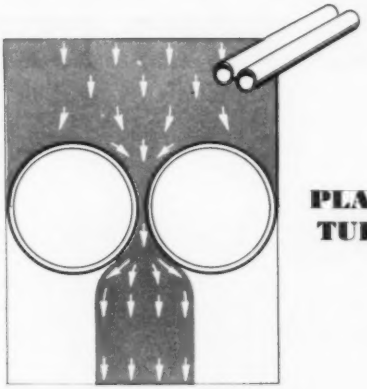
Because Trufin has a greater outside surface area per foot, thereby effecting greater working capacity, this distinctive integral finned tube is capable of increasing the efficiency of your heat exchangers, oil coolers or condensers.

Reference to the accompanying diagram will show you how Trufin presents much more contact area to the fluid and also allows more free area for its flow.

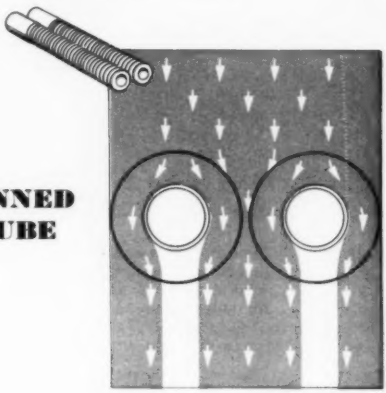
These advantages contribute immeasurably to: (1) an increased heat transfer capacity of the unit, and (2) a decrease in pressure drop. These, in turn, often permit the use of smaller equipment, thus reducing wear and tear.

**Reg. U. S. Pat. Off.*

*Wolverine Trufin and the Wolverine Spun End Process available in Canada through Unifin Tube Co., London, Ont.*



**PLAIN TUBE**



**FINNED TUBE**

This illustration shows the results found in our laboratory tests. A plain tube, ¾" O.D. and Trufin having ⅝" root diameter were used in the tests (the outside diameter of the fins is comparable to that of the ¾" plain tube). The center distance between the plain tube and the finned tube conformed to the code requirements of a minimum 15/16" spacing. Both oil and water were used in the tests.

**WOLVERINE TUBE DIVISION**
Calumet & Hecla Consolidated Copper Company
INCORPORATED
*Manufacturers of seamless, nonferrous tubing*
1459 CENTRAL AVE. • DETROIT 9, MICH.

*Wolverine Condenser Tubes stocked by Butler Industries, Inc., 355 South Fourth Street, Beaumont, Texas. Tel.: Beaumont 5-2351.*

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

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# *It's the Nash!*

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

**No internal wearing parts.**

**No valves, pistons, or vanes.**

**No internal lubrication.**

**Low maintenance cost.**

**Saves floor space.**

**Desired delivery temperature automatically maintained.**

**Slugs of liquid entering pump will do no harm.**

**75 pounds in a single stage.**

**NASH ENGINEERING COMPANY**
**313 WILSON, SO. NORWALK, CONN.**

# You can't get caught in this trap!

NO threads to gall or freeze
NO leaky seals
NO doubt about strength—
conforms to all codes
NO multi-bolt flanges
NO thing to drop

## That's UNIBOLT

Self-Sealing Gasket—made of Hycar (oil and gas resistant rubber)—is the final answer to scraper trap leaks. Its lipped design makes it self-sealing under line pressure. The coupling cannot be overtightened to the extent of damaging the gasket or the coupling itself.

Release two bolts. Swing the trap open. Take the pig out or put the pig in. Close the trap and tighten two bolts. That's just how simple and easy it is to operate a UNIBOLT Scraper Trap. An oversize barrel (slightly larger than the o.d. of the pig) makes it equally easy to start a pig. Line pressure does the heavy work.

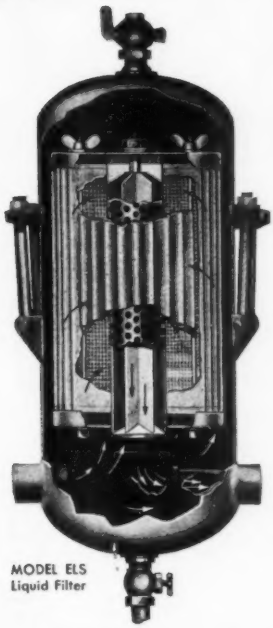
Pipeliners everywhere are using UNIBOLT closures and couplings for scraper traps, blowdowns, strainers, mist removers and other large diameter pressure vessels. A UNIBOLT representative will gladly explain the advantageous features of these products to you.

**THORNHILL-CRAVER CO.**

**P. O. BOX 1184** UNIBOLT **HOUSTON, TEXAS**

# TRAPPED!

## "STAYNEW LIQUID FILTERS KEEP US OUT!"



MODEL ELS
Liquid Filter

Rust, pipe scale and other impurities are stopped completely by Staynew's versatile ELS Liquid Filter. Ideal for application in countless industries where clean liquids are required, the Model ELS removes the finest particles with minimum loss of pressure. And Staynew's liquid filtration process *will not* change chemical properties in any way.

No matter how complex your filtration problem, look to Staynew for the answer. The Dollinger Corporation maintains a fully equipped research laboratory to design filters for any type of liquid filtration.

- Most versatile filter made.
- Widest range of filtering media (both fabrics and metallic meshes).
- Greatest active filtering area for any given space.
- Radial Fin Insert Assembly—easily and quickly installed, as a unit, in field.
- SLIP-ON Filtering Medium easily changed or replaced in the field.
- "Swing-bolt" head construction for easy inspection and servicing.

*For Complete Information, write today for Staynew Liquid Filter Bulletin D-IL*

Representatives in Principal Cities

DOLLINGER PROTECTOMOTOR STAYNEW FILTERS

# DOLLINGER CORPORATION

5 Centre Pk., Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

# WHERE'S THE FIRE?

There are danger spots in every building (yours, too!) where fire is most likely to strike. These spots can be guarded day and night by a Kidde Automatic Fire Extinguishing System.

At the first sign of flame the Kidde system releases carbon dioxide ($CO_2$) which blankets the fire—literally smothers it instantly. You can protect several spaces with a single Kidde system . . . or have separate protection for such hazards as a dip tank or generator.

With a Kidde System, there is no water damage, no messy residue to ruin costly machinery, electrical equipment or documents. And that means no interruption in production. Find out more about Kidde Fire Protection today. Write to:

**Walter Kidde & Company, Inc.**
**254 Main Street, Belleville 9, N. J.**

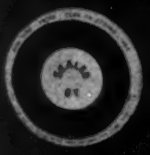
**Kidde**

**Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.**

TRETOLITE COMPANY

# Tret-O-lite

SAINT LOUIS · LOS ANGELES



## A GOOD INVESTMENT

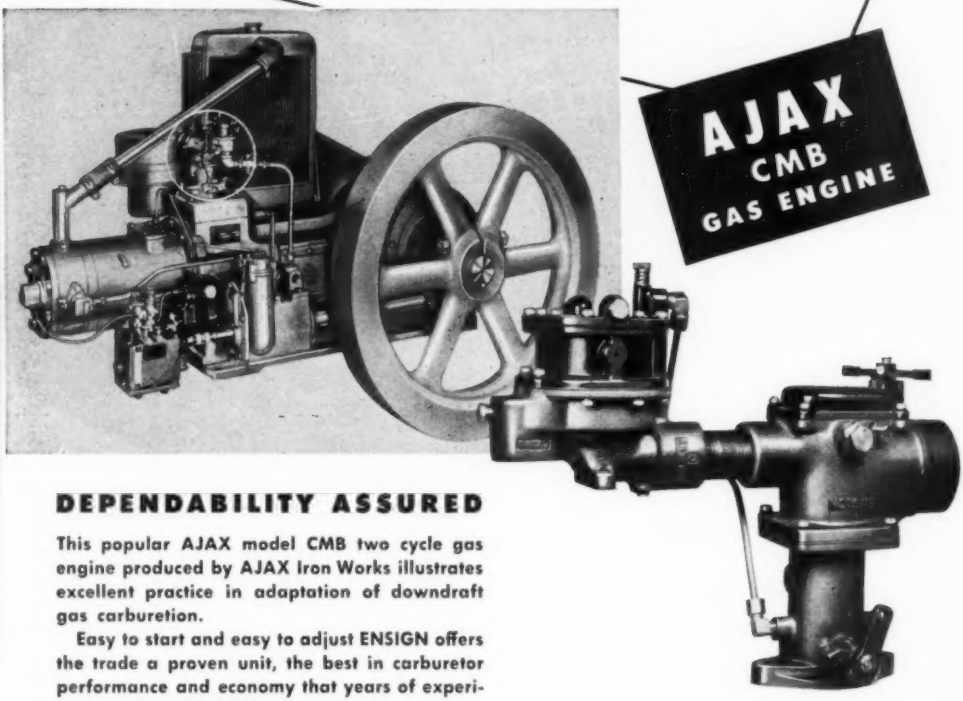
The purchase of Tret-O-lite time-proven dehydrating reagents, backed by the know-how of experienced Tret-O-lite field engineers, is an investment in smooth, trouble-free dehydrating operations. The low cost of Tret-O-lite efficiency and service is more than offset by low cuts that always meet, or better, pipe-line specifications, minimum tank-bottom accumulation, and the advantage of selling in the highest possible gravity range. Don't consider the cost of dehydration as a production expense — think of it as an investment in trouble-free operations.

**TRETOLITE COMPANY**
SAINT LOUIS 19, MISSOURI · LOS ANGELES 22, CALIF.

*Chemicals for the Petroleum Industry*
DEHYDRATING • DESALTING • CORROSION INHIBITING
WATER DE-OILING • SCALE PREVENTING
PARAFFIN REMOVING

T 52-1

# ENSIGN takes the lead in single cylinder gas engine CARBURETION




## DEPENDABILITY ASSURED

**This popular AJAX model CMB two cycle gas engine produced by AJAX Iron Works illustrates excellent practice in adaptation of downdraft gas carburetion.**

**Easy to start and easy to adjust ENSIGN offers the trade a proven unit, the best in carburetor performance and economy that years of experience and technical skill can produce.**

**It matters little the type of engine: Slow speed single cylinder two or four cycle or the high speed multi-cylinder type, ENSIGN is PROVED and ACCEPTED the world over with DEPENDABILITY ASSURED.**

***Ensign "Kgl" Gas Carburetor and Model "B" Fuel Regulator***

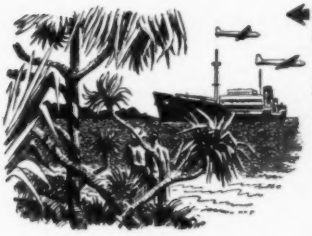
*This advertisement is one of a series featuring popular makes of gas engines in field service.*

**ENSIGN**
**CARBURETOR COMPANY**
7010 SOUTH ALAMEDA ST., P.O. BOX 229
HUNTINGTON PARK, CALIFORNIA
Branch Factory: 2330 West 58th Street, Chicago 36, Illinois
Dealers and Distributors in All Principal Oil Fields

# "What does it take from an oil company to run an airlift?"

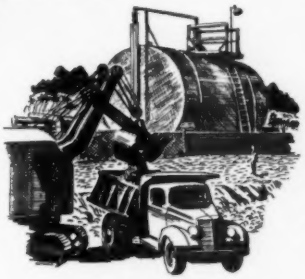
**Ever since mid-summer of 1950, military activity in Korea** *has called for heavy trans-pacific air traffic by civilian cargo planes. Over one of their routes they fly a round trip of 13,450 miles—some 26 times the length of the famous Berlin airlift. Hundreds of companies help supply this operation. Maybe you'd like to know what it takes from an oil company to run an airlift.*

**Standard's part in the Pacific airlift** shows that it's a big help to have large companies on hand when the going gets rough. Our work is focused mainly at Wake Island, that pinpoint some 4000 miles from the U. S. West Coast. After World War II, Wake was a refueling stop for commercial airliners en route to the Orient. But then came the struggle at the 38th parallel—

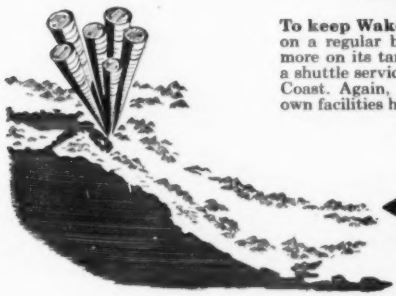


**Before trouble kindled in Korea,** only 20 planes a week refueled at Wake Island. Then that number multiplied many times—calling for more gas *fast*. We'd been serving the island; when the U. S. asked us to step up deliveries, we were able to do it. As a big, integrated company, we called on our own tanker fleet.

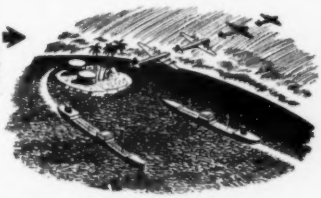
**As air activity stepped up even more,** Wake needed larger ground crews. Standard's bigness helped again. Using facilities in Honolulu, we quickly trained men to handle high-octane gas, tripled our manpower on Wake.



**To secure the special loading equipment** needed by the ground crews, a Standard ship picked up the nearest available—at far-off Canton Island. And at U. S. request, we helped build new storage facilities at Wake.



**To keep Wake and the airlift** supplied on a regular basis, Standard drew once more on its tanker fleet. We now operate a shuttle service to Wake from the Pacific Coast. Again, being big and having our own facilities helps us serve.



**Of course, the transpacific airlift** starts in America, and at home on this end of the route Standard keeps some 10 airlines supplied with aviation gasoline. It would take a stack of drums *a mile high* to hold our increased daily output for this use. At the same time, we're also supplying military needs . . . and our usual volume for motorists.

## STANDARD OIL COMPANY OF CALIFORNIA

• plans ahead to serve you better

# To get maximum tube life per dollar... Ask the experts!

THERE'S only *one* high temperature tube steel that can give you maximum tube life per dollar—the best life/cost ratio—under a particular set of heat, pressure, corrosion and oxidation conditions.

To make sure you get the right steel, go to the metallurgists of The Timken Roller Bearing Company. They're recognized authorities on high temperature steels. With 20 years experience in research and with 23 different analyses at their disposal, they'll help you select the one best steel for your operating conditions. And you're assured of uniform, high quality steel in every tube because of the Timken Company's rigid quality control from melt shop through final tube inspection.

Let our "RSQ"—Research, Supply, Quality—solve your tube problems. Ask the experts! The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

*This month's report is on:* **DM STEEL**

Has unusually high creep strength for a pearlitic steel, good stability up to 1200°F., fairly good corrosion and oxidation resistance. Has 2 to 3 times the life of carbon steel where corrosion is not severe. Recommended for cracking furnace tubes, hot oil lines, superheater tubes, high temperature steam piping and forgings for accessory parts.

**23 TIMKEN® STEELS FOR HIGH TEMPERATURE SERVICE**

| | | | |
|---|---|---|---|
| Carbon | Sicromo 2 | Sicromo 55 | 16-13-3 |
| Carbon-Mo. | Sicromo 2½ | Sicromo 5MS | 25-20 |
| DM-2 | 2¼% Cr.-1% Mo. | Sicromo 7 | 25-12 |
| Silmo | Sicromo 3 | Sicromo 9M | 35-15* |
| DM | 4-6% Cr.-Mo. | 18-8 Stainless | 16-25-6* |
| 2% Cr.-Mo. | 4-6% Cr.-Mo.-Ti. | 18-8 Cb | |

**Not available as seamless tubing at the present time.*

*Pictured above is a direct-reading spectrometer, used in the Timken Company's Spectrographic Laboratory. It chemically analyzes a molten heat of Timken steel in just 40 seconds, makes possible precise control of the steel's properties.*

**SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING**

# Siamese Twins!

- It's Shand & Jurs' combination Breather Valve and Gauge Hatch for small marketing and bulk plant tanks — Fig. ST-1615.
- Rugged all aluminum body houses both units and fits single 3" tank connection.
- Economical with high venting capacity and full 3" gauge hatch opening.
- Quick removable pressure hood for easy access to internal parts for inspection or maintenance.
- Screw down, soft seated, self closing and vapor tight gauge cover made of bronze.
- Breather Valve set for standard pressure loading of 4 ounces; ½ ounce for vacuum. Special settings available as required.

**Shand and Jurs Co.** 8TH AND CARLTON STREETS : BERKELEY : CALIFORNIA

NEW YORK 295 Madison Ave. | CHICAGO 10409 S. Western Ave. | HOUSTON 814 M & M Bldg. | TULSA 310 Thompson Bldg. | LOS ANGELES 714 W. Olympic Blvd. | SEATTLE 3000 Western Ave.

MONTREAL, QUE., 360 Notre Dame St. West | VANCOUVER, B. C., 550 Beatty St. | FORT ERIE, ONT. | DARLINGTON, ENG. | CARACAS, VEN.

Whether you want one worm-gear speed reducer or a thousand, a standard drive or a unit designed to meet special problems, Cleveland can serve you better.

# At your service on dependable worm-gearing

• For dependable worm-gearing, consult Cleveland—a company which for 40 years has devoted its engineering skill and production facilities exclusively to the manufacture of high grade, precision-built worms and gears. Cleveland offers a complete line of worm gear sets and speed reducers, including the popular fan-cooled Speedaire—to meet the requirements of any machinery or equipment builder or user for this convenient, right-angle drive.

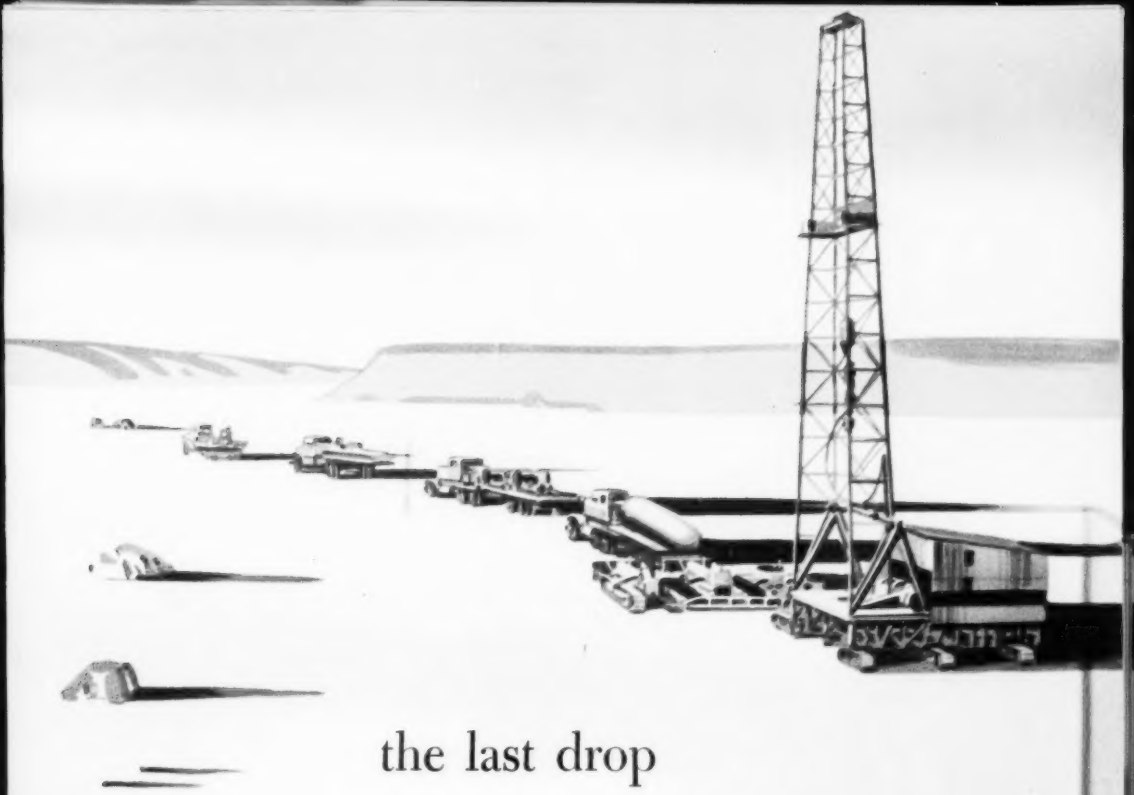
Our sales representatives, located in major industrial market centers, are ready to sit down with you and discuss your power transmission needs, to help you select correct types and sizes.

Write for our latest catalog and give us an idea of your requirements. Your inquiry will receive our careful attention.

The Cleveland Worm & Gear Company, 3286 East 80th Street, Cleveland 4, Ohio.

*Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.*

CLEVELAND
Worm Gear
*Speed Reducers*



# the last drop of **OIL**

Almost every day there's a new horizon of discovery in the world of oil—deeper down in the earth, at some remote location, or right in the middle of the petroleum industry's biggest producing fields.

In spite of the discoveries which add constantly to the world's oil resources there are those who talk just as constantly about the last drop of oil which will be extracted from the earth—and who have talked about that last drop of oil for more than a quarter century.

During all of those years the worldwide petroleum industry has reacted as if each such statement was another challenge to drill deeper, explore further, and expand oil reserves. And, during that same quarter century National Supply has improved equipment and developed new oil field machinery to drill the trickiest oil-bearing formations and aid in maximum ultimate recovery.

Because of this close working relationship with the petroleum industry, the Spang tubular products, the National and Ideal machinery and equipment, and the Superior engines used in so many drilling projects and production operations bear these familiar identifying National Supply trademarks.

The expansion of National's supply services to the petroleum industry, and of its continuing research and development programs, are evidence that the challenge has also been accepted by National Supply.

Thus, the world-wide search for oil, and the companion measures which are directed toward conserving oil down to the last drop, are evidence of the teamwork which is building the world's petroleum reserves to new and safer levels.

**THE NATIONAL SUPPLY COMPANY**

**General Sales Offices: Toledo, Ohio**

NATIONAL BLUE PRODUCTS

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIP

# IDEAL

## CONSOLIDATED RIGS

## for drilling at any depth in any type of formation

The constant improvement in "Ideal" Drilling Rigs is another result of the close working relationship between the petroleum industry and the oil field equipment specialists of National Supply.

First, there's the growing family of rigs now numbering ten in all and ranging in size from 80 input horsepower to 2010 input horsepower. The smallest of the group, the new "Ideal" T-8 Rig, is especially suited to shallow-well and servicing projects, as well as for initial drilling of wells which will be completed with one of the heavier-duty rigs.

Second, there are the mechanical improvements, such as—

- **UNITIZED ASSEMBLY—Consolidates the advantages and economies of packaged transportation and quick rig up.**
- **DY-A-FLEX CLUTCHES—Designed and built by National Supply engineers for compatible operation with Ideal Rigs.**
- **FLUID DRIVES—The "velvet harness" that provides smooth, flexible and accurate power and speed control.**
- **AIR CONTROLS—Centralized at driller's station to facilitate rig operation for faster and more efficient drilling.**

Third, there is the continuing research in materials and methods which makes it possible for National Supply engineers to design "Ideal" Rigs which are so sturdily built that they keep right on drilling after most rigs would be worn out.

These are just a few of the reasons why it's always worthwhile to keep in touch with your National Supply Store for everything that's new and everything that's standard in oil drilling and production equipment.

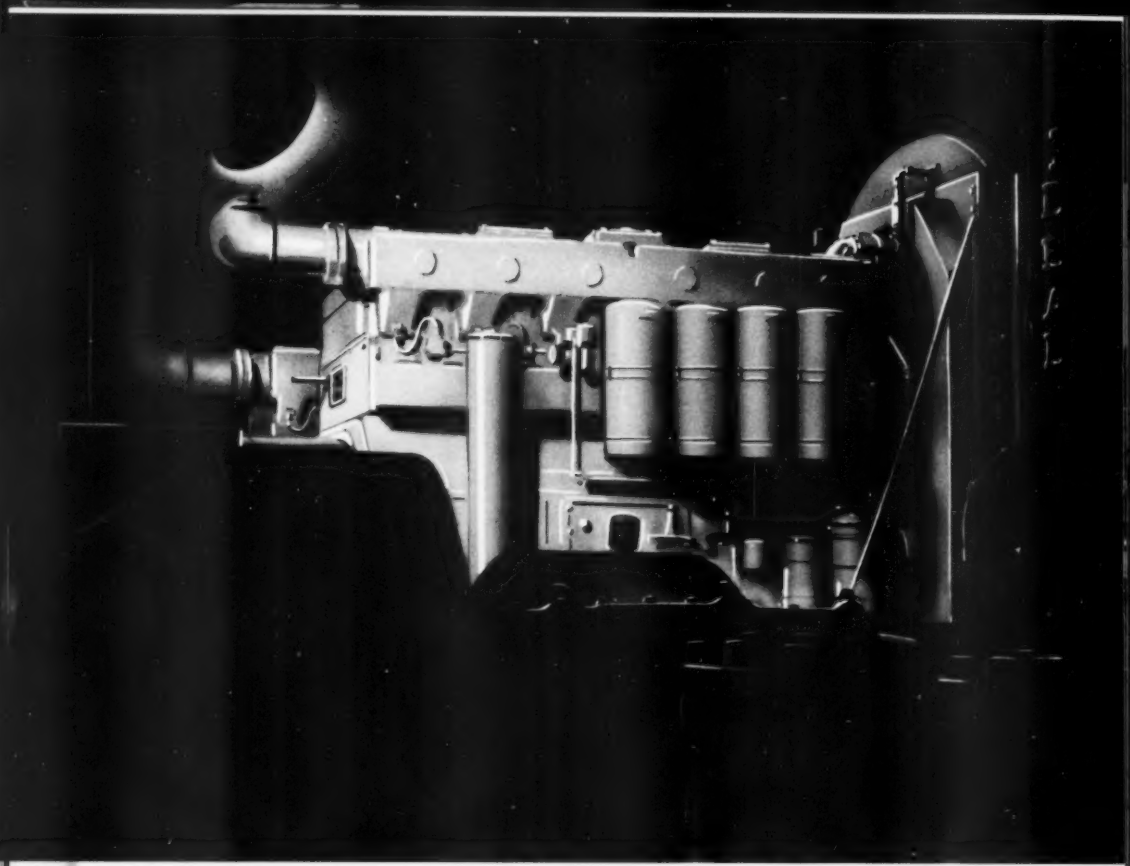
NATIONAL BLUE PRODUCTS

**DIVISION OFFICES:** Casper; Ft. Worth; Houston; Pittsburgh; Tulsa; Torrance
**CANADA:** The National Supply Company, Limited, 702 Barron Building, 610 Eighth Avenue, West, Calgary, Alberta
**EXPORT:** 600 Fifth Avenue, New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London, E. C. 2

UPERIOR & ATLAS ENGINES

HE NATIONAL SUPPLY COMPANY

General Sales Offices: Toledo, Ohio



# **POWER** that's proved around the world of oil...

The extent of National Supply's service to the petroleum industry is emphasized by the variety of National and Ideal equipment in constant use in the major oil producing areas throughout the world. Because this equipment was developed and manufactured to work together it has established records of efficient and dependable service under all types of operating conditions.

It's understandable, then, that the dependability and efficiency of Superior Diesel and Gas Drilling Engines have been similarly tested because they, too, have been used for many years in oil field service throughout the world. Their performance under all conditions in all climates has resulted in repeat purchases of these 4-cycle engines for some of the most important drilling operations in the U.S.A., in Canada, and overseas.

Superior Diesel and Dual-Fuel Drilling Engines are built in 6 and 8 cylinder models, either naturally-aspirated or supercharged, with ratings from 280 to 670 horsepower. The 6-cylinder Superior Gas Drilling Engine for operation on natural gas or butane fuel is rated at 300 hp. All of these engines are designed for use as single units or in multiple-engine applications with National "Ideal" Sectional Drive Groups, and when so arranged they provide abundant power for operating rotary, draw works and pumps.

**THE NATIONAL SUPPLY COMPANY**

General Sales Offices: Toledo, Ohio

NATIONAL BLUE PRODUCTS

**DIVISION OFFICES:** Casper; Ft. Worth; Houston; Pittsburgh; Tulsa; Torrance

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Thermoid
Industrial Rubber Products
Quality Value Service

## Thermoid Trioflex Rotary Hose makes new friends among old timers

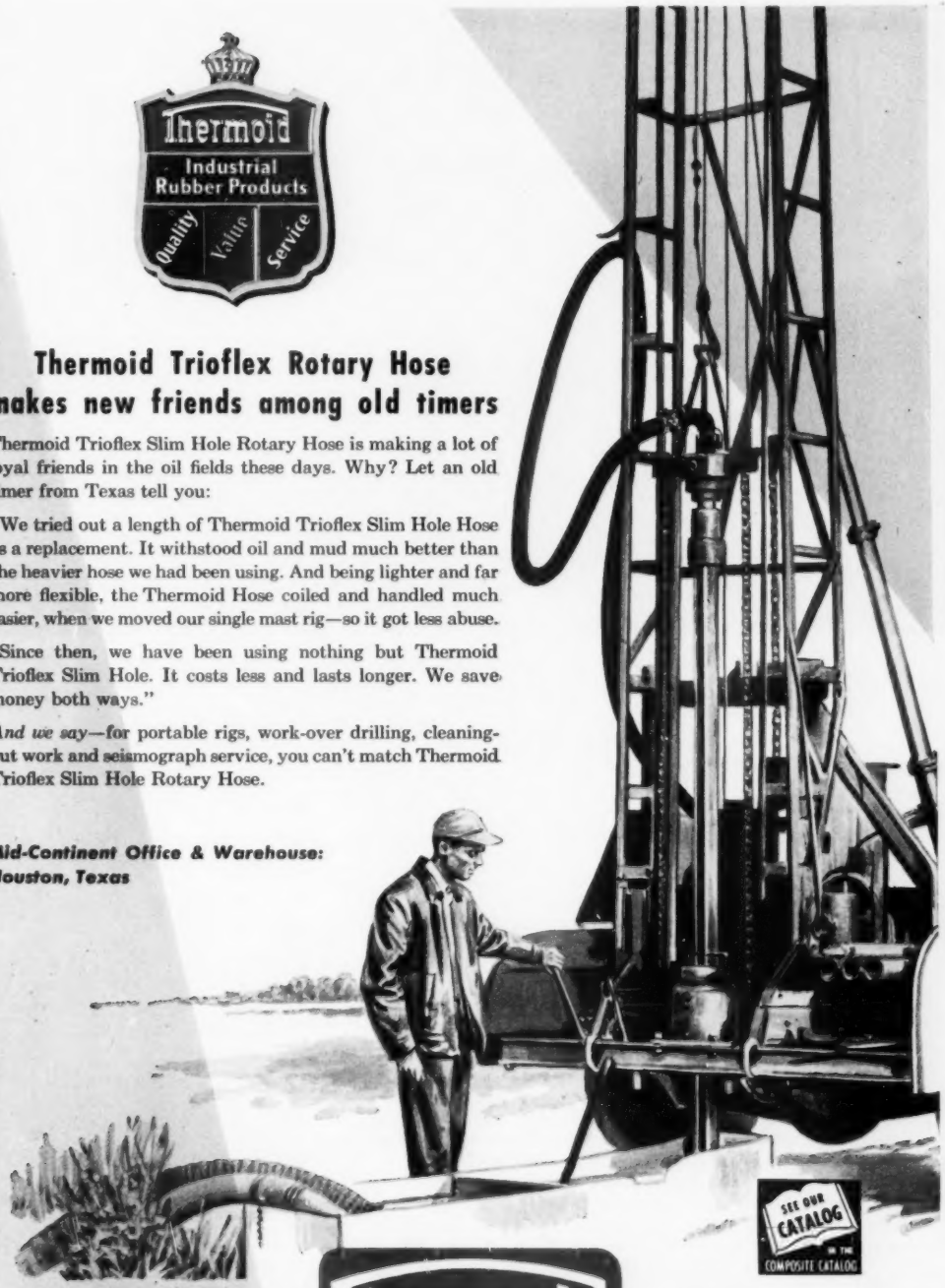
Thermoid Trioflex Slim Hole Rotary Hose is making a lot of loyal friends in the oil fields these days. Why? Let an old timer from Texas tell you:

"We tried out a length of Thermoid Trioflex Slim Hole Hose as a replacement. It withstood oil and mud much better than the heavier hose we had been using. And being lighter and far more flexible, the Thermoid Hose coiled and handled much easier, when we moved our single mast rig—so it got less abuse.

"Since then, we have been using nothing but Thermoid Trioflex Slim Hole. It costs less and lasts longer. We save money both ways."

*And we say*—for portable rigs, work-over drilling, cleaning-out work and seismograph service, you can't match Thermoid Trioflex Slim Hole Rotary Hose.

***Mid-Continent Office & Warehouse: Houston, Texas***

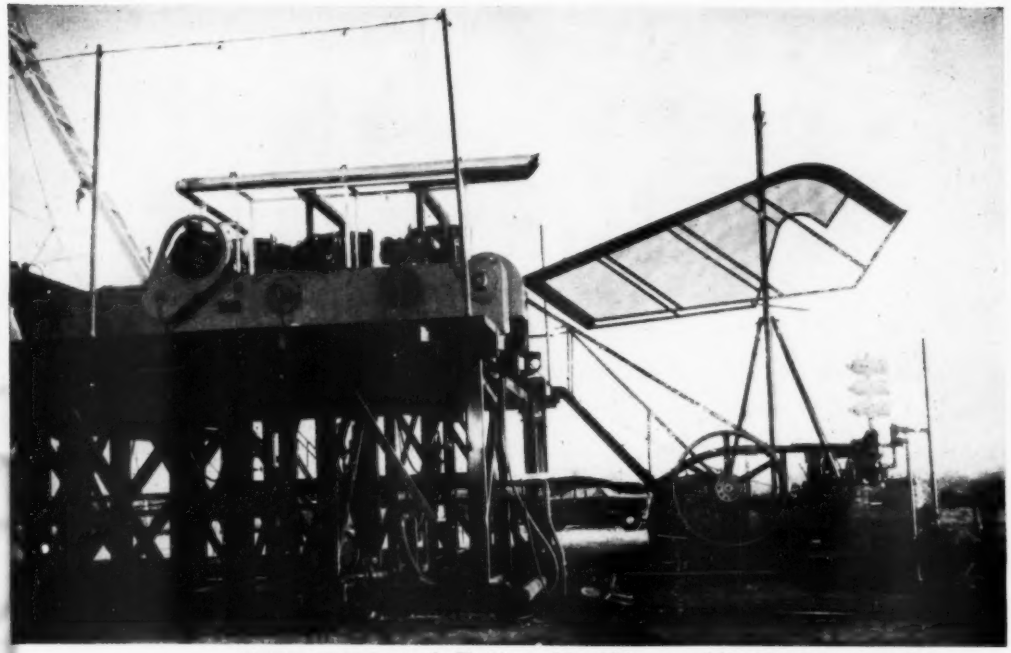



Thermoid

Powerflex Rotary Hose • Trioflex Slim-Hole Rotary Hose • Mud-Flo Slush Pump Hose • Flexible Discharge Units • F.H.P. and Multiple V-Belts • Oil Country Flat Belting

Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



BORN IN THE OIL FIELDS, the Worthington QD sheave is first choice of all industry. Servicing rigs like this one is a much easier job since the QD became available—it's easier to get on, easier to get off, yet always tight on the shaft. And you can get the sizes you need QUICKLY!

# We built it to your specifications

Yes, it was the demands of oil production men like you that gave the Worthington QD* sheave its start. Today *all* industries use it. In fact it's the *most widely used* hub-and-rim combination in existence.

Why?

IT'S STRONGER because each size is individually designed for the load it has to carry. Not just *one* standard design for all sizes.

IT'S EASIER TO GET ON—lightweight split hub is clamped to shaft, then heavier taper-bored rim is easily slipped over and press-fitted to hub.

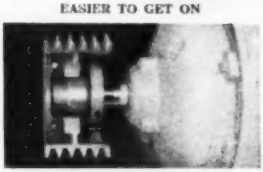
IT'S EASIER TO GET OFF—long pull-up bolts serve as jack screws to remove rim, hub stays put so that there's no realignment problem.

IT'S QUICKLY AVAILABLE—Local distributors in all oil-field areas are stocked-up in most sizes and they're backed up by factory stocks in Los Angeles, Fort Worth, Houston, Tulsa and New Orleans.

IT'LL PAY YOU TO STANDARDIZE on the Worthington QD*. Worthington Pump and Machinery Corporation, Multi-V-Drive Sales Division, Buffalo, N. Y.

*Reg. U. S. Pat. Off.

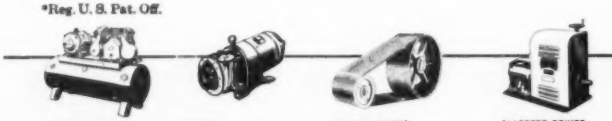
EASIER TO GET ON



EASIER TO GET OFF

YET ALWAYS TIGHT ON THE SHAFT

MV.2.8



COMPRESSORS: AIR COOLED, WATER COOLED

PUMPS: CENTRIFUGAL, ROTARY, STEAM, POWER

MULTI-V-DRIVES: QD SHEAVES AND V-BELTS

ALLSPEED DRIVES: WORTHINGTON ALLSPEED

**Buy these Worthington standard products from your local distributor**

**WORTHINGTON**

Multi-V-Drives

ANOTHER FIRST!
In a never ending search to provide the finest in service and
supplies Mid-Continent Supply Company has come up with
another "First" . . . the Swinging Final Drive. This new
and shortens rigging up time by eliminating the
problem of aligning sprockets and connecting
the chain between the compound and the
input of the drawworks and is the key
to fast, easy moves. . . Developed to
simplify the job, the Swinging
Final Drive is an impor-
tant, progressive step
forward in oil
well drilling.

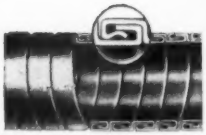
# MID-CONTINENT Supply Company

General Offices Mid-Continent Bldg. FORT WORTH, TEXAS

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

## Wherever petroleum products must be conveyed . . . . .



*CMH convoluted hose is available in a variety of types including square locked, ball bearing and fully interlocked . . . in steel, bronze and other alloys. Sizes up to 12", I.D.*

*CMH corrugated steel and bronze hose is available in standard sizes from ½" through 12" I.D. for burst pressures to 12,000 psi, temperatures to 1000° F. Stainless steel types also available.*

# CMH

### FLEXIBLE METAL HOSE makes the job easier!

AT THE well head, in transport or in the refinery, CMH Flexible Metal Hose can simplify handling petroleum products. Its high degree of flexibility combined with the rugged durability of metal makes it ideal for any connections that involve motion, vibration or misalignment. Used as vibration connections, as loading and unloading hose, as tank settling connections and in a score of similar applications, CMH Flexible Metal Hose provides the dependability so vital to the petroleum industry. Freedom from deterioration and resistance to wear and tear assures greater over-all economy.

Write for descriptive literature giving full information on CMH Flexible Metal Hose. There is no obligation.

**CHICAGO METAL HOSE Division**

**Flexonics** *Corporation*

**1345 S. Third Avenue • Maywood, Illinois**

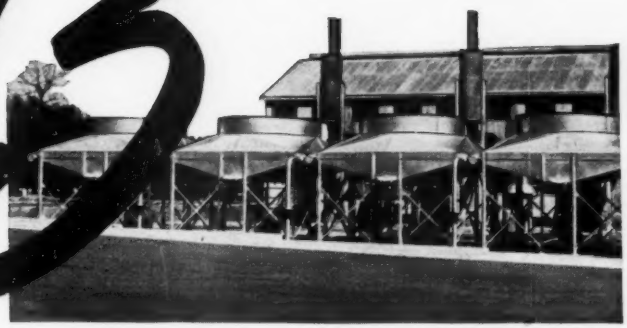
Manufacturers of Convoluted and Corrugated Flexible Metal Hose in a Variety of Metals • Expansion Joints for Piping Systems • Stainless Steel and Brass Bellows • Flexible Metal Conduit and Armor • Assemblies of These Components

**In Canada: Flexonics Corporation of Canada, Ltd., Brampton, Ontario**

Flexon identifies CMH products that have served industry for over 50 years.

## on the Tennessee Gas Transmission Pipe Line

# 213 AIRCOOLERS



## GIVE FAST, EFFECTIVE COOLING

At twenty-six stations on the Tennessee Gas Transmission Pipe Line, 213 ALCO Aircoolers handle jacket water and auxiliary engine water cooling requirements.

Using both Radiator Core and Fintube Aircoolers, Models 81, 84, 4 and T/6, engineers found that water treatment, scale and corrosion problems were eliminated. Other advantages of these compact ALCO Aircoolers include:

**1. LOW OPERATING COST**—in addition to low first cost, ALCO standardized parts . . . broad heat transfer experience . . . volume production . . . plus correctly engineered safety factors . . . insure *real* economies.

**2. FLEXIBLE DESIGN**—you can get either the radiator core or fintube type cooler from ALCO, powered by electricity, steam, gas or oil.

**3. EFFICIENT PERFORMANCE**—induced draft design eliminates the chance of recycling hot air with a subsequent loss in heat transfer.

**4. EASY MAINTENANCE**—fewer parts, easy accessibility and better wearing characteristics.

**5. QUICK INSTALLATION**—for fast field assembly, every part is marked and identified on assembly drawings so that no specialized labor is required.

Write to ALCO Products Division, American Locomotive Company, Schenectady, N. Y. for a copy of ALCO Aircooler Bulletin, or call your nearest ALCO Sales Engineer at Beaumont, Chicago, Houston, Los Angeles, New York or Tulsa. Plants at Dunkirk, New York, and Beaumont, Texas.

ALCO

ALCO Products Division

AMERICAN LOCOMOTIVE COMPANY

***In step with tomorrow***—ALCO AIRCOOLERS, Heat Exchangers, Evaporators, Feedwater Heaters, Pressure Vessels, Pipe

# PICTURE OF A Reliable RIG!

No V-Belt troubles are going to shut down *this* rig—it keeps right on making hole, day in and day out. This operator saw to that, when he specified Dayton Thorobred V-Belts!

Thorobreds *stay* on the job because they're made with cords of continuous filament, high-tenacity rayon—electronically processed on Dayton's exclusive electronic train. That's the secret of the greater shock strength and rugged durability you find in Dayton Thorobred Drives.

Make sure *your* rig keeps drilling—make sure your crew doesn't have to stand around waiting for a drive to be repaired. Put Dayton Thorobreds to work on your equipment. You get fast, dependable service from strategically located Dayton Distributors and Dayton warehouses in all leading oil areas.

**DAYTON RUBBER COMPANY • DAYTON 1, OHIO**

©D.R. 1952

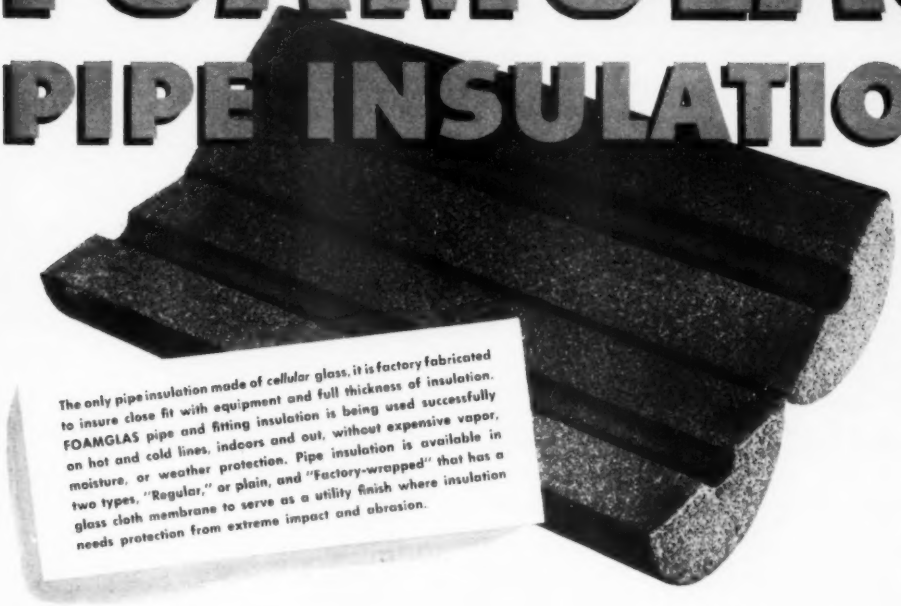
V-Belts by **Dayton Rubber**

*Since 1905*

**WORLD'S LARGEST MANUFACTURER OF V-BELTS**

# THIS IS FOAMGLAS®

## PIPE INSULATION



The only pipe insulation made of cellular glass, it is factory fabricated to insure close fit with equipment and full thickness of insulation. FOAMGLAS pipe and fitting insulation is being used successfully on hot and cold lines, indoors and out, without expensive vapor, moisture, or weather protection. Pipe insulation is available in two types, "Regular," or plain, and "Factory-wrapped" that has a glass cloth membrane to serve as a utility finish where insulation needs protection from extreme impact and abrasion.

## There is no other insulation like it . . . Here's why:

**FOAMGLAS** is not a fiber, a batt, a blanket, wool or board. It contains no granular or organic material. It is composed entirely of still air sealed in millions of minute glass cells.

**FOAMGLAS** eliminates the need for extra moisture and vapor barriers. It is practically impervious to fumes, chemicals and many other elements, therefore *retains* its original insulating efficiency throughout exceptionally long service.

**FOAMGLAS** is an effective barrier to heat flow. It helps maintain predetermined temperatures. It is being used successfully in many and varied high and low temperature applications on pipe lines.

**FOAMGLAS** is light, strong, rigid, durable. It cannot burn. Insects and vermin cannot nest in it, eat into or through it. FOAMGLAS needs no special type weatherproofing when used outdoors.

PITTSBURGH PC CORNING

Pittsburgh Corning Corporation
Dept. DD-22, 307 Fourth Avenue, Pittsburgh 22, Pa.

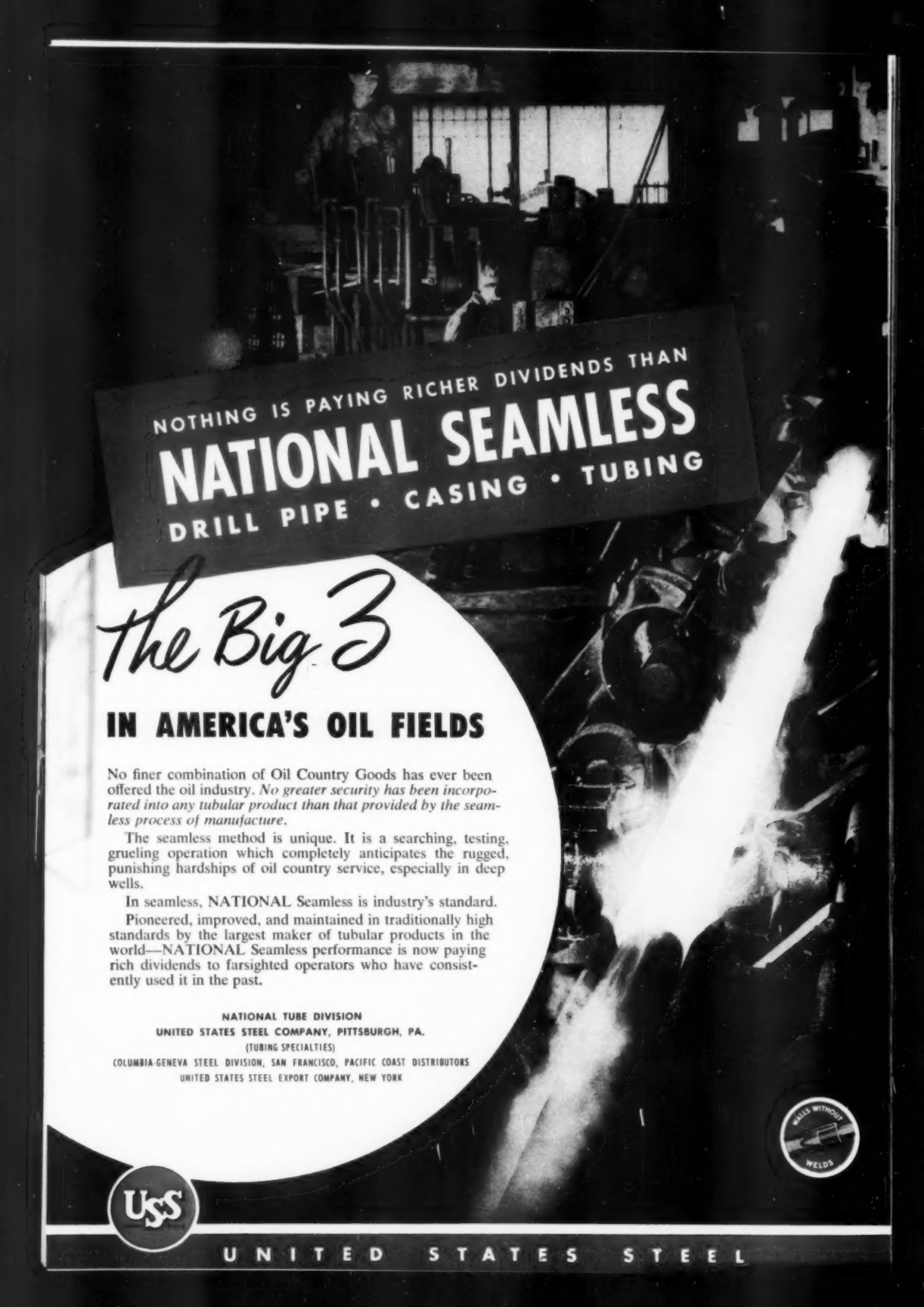
Please send me without obligation a sample of FOAMGLAS and your FREE booklet on the use of FOAMGLAS for Piping and Process Equipment.

Name .....

Address .....

City ..... State .....

**PITTSBURGH CORNING CORPORATION • PITTSBURGH 22, PA.**


NOTHING IS PAYING RICHER DIVIDENDS THAN
NATIONAL SEAMLESS
DRILL PIPE • CASING • TUBING
the Big 3
IN AMERICA'S OIL FIELDS
No finer combination of Oil Country Goods has ever been offered the oil industry. *No greater security has been incorporated into any tubular product than that provided by the seamless process of manufacture.*
The seamless method is unique. It is a searching, testing, grueling operation which completely anticipates the rugged, punishing hardships of oil country service, especially in deep wells.
In seamless, NATIONAL Seamless is industry's standard.
Pioneered, improved, and maintained in traditionally high standards by the largest maker of tubular products in the world—NATIONAL Seamless performance is now paying rich dividends to farsighted operators who have consistently used it in the past.
NATIONAL TUBE DIVISION
UNITED STATES STEEL COMPANY, PITTSBURGH, PA.
(TUBING SPECIALTIES)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK
WALLS WITHOUT WELDS
USS
UNITED STATES STEEL

*Coated and wrapped—ready for long service*

*Bitumastic Enamel being machine-applied*

# *Best barrier against corrosion...*

# BITUMASTIC® ENAMEL

● If you keep moisture away from pipe-line surfaces with a protective coating, you prevent corrosion. But there's one point to bear in mind: *ordinary* protective coatings just can't keep out moisture, year after year.

But Bitumastic Enamels can—*because they're far from ordinary.*

First, these durable enamels are processed from a base of selected coal-tar pitches, *making them impervious to moisture.* Further, they make a tight bond with the pipe, and don't disintegrate with age. And they are capable of applications in one coat to a substantial thickness of approximately 3/32 of an inch. Finally, they are chemically resistant to soil elements, and maintain continuously high electrical resistance.

Through the years, these qualities have proved themselves. Many oil and gas pipe lines, protected by Bitumastic Enamels in the '20's, are still giving good service today.

Specify Bitumastic Enamels and give your pipe lines the same effective protection against corrosion. Your Koppers representative will give you complete details and estimates.

**Bitumastic Enamels soon available from Koppers new California Plant!**

As soon as present construction work is completed, Koppers will be able to supply Bitumastic Enamels from a new plant at Fontana, California. The plant is being built to give you better service in the West.

KOPPERS BITUMASTIC ENAMELS

REG. U. S. PAT. OFF.

**KOPPERS COMPANY, INC., Tar Products Division, Dept. 203TA, Pittsburgh 19, Pa.**

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

ANOTHER AMERICAN® ADVANCE

# NEW TEFLON SEAL STUFFING BOX FOR HIGH PRESSURE ORIFICE METERS

Pressures to 10,000 psi.
Temperatures to 450°F.

*Combining*

- MAXIMUM ACCURACY
- MINIMUM FRICTION
- NO LUBRICATION
- NO LEAKAGE
- NO SHAFT FREEZING

## New Accuracy! New Efficiency!

This new Type "B" stuffing box extends the benefits of Teflon to heavy-duty high-pressure American Westcott orifice meters — long noted for *simplicity of design, extreme accuracy* and *trouble-free,* dependable service.

The Teflon seal forms a packing and bearing around a precision-made Monel metal shaft of increased diameter for greater rigidity. It is pressure tight, nearly frictionless, *requires no lubrication* and reduces maintenance to a minimum. Other parts are corrosion resistant stainless steel. An external guard protects against shaft damage. The new stuffing box is suited to ambient meter temperatures to 450°F. and pressures to 10,000 psi.

The Teflon bearing and all other stuffing box parts can be removed and replaced in the field. Units are adaptable to older types of American Westcott orifice meters now in service. Write for complete details.

Another example of American's policy of constant product improvement, upholding a century-old tradition of "Sustained Accuracy at Lower Cost."

GENERAL SALES OFFICE: 1313 Race Street, Philadelphia
Albany • Alhambra • Atlanta • Baltimore • Birmingham
Boston • Chicago • Dallas • Denver • Erie • Houston
Kansas City • Los Angeles • Minneapolis • New York • Odessa
Pittsburgh • San Francisco • Tulsa • Canadian Meter Co., Ltd.,
Hamilton, Ontario • Edmonton, Alberta

AMERICAN METER COMPANY
MEASUREMENT ENGINEERS

AMERICAN METER COMPANY
INCORPORATED (ESTABLISHED 1836)

# greater EFFICIENCY on Wilson atlas rigs

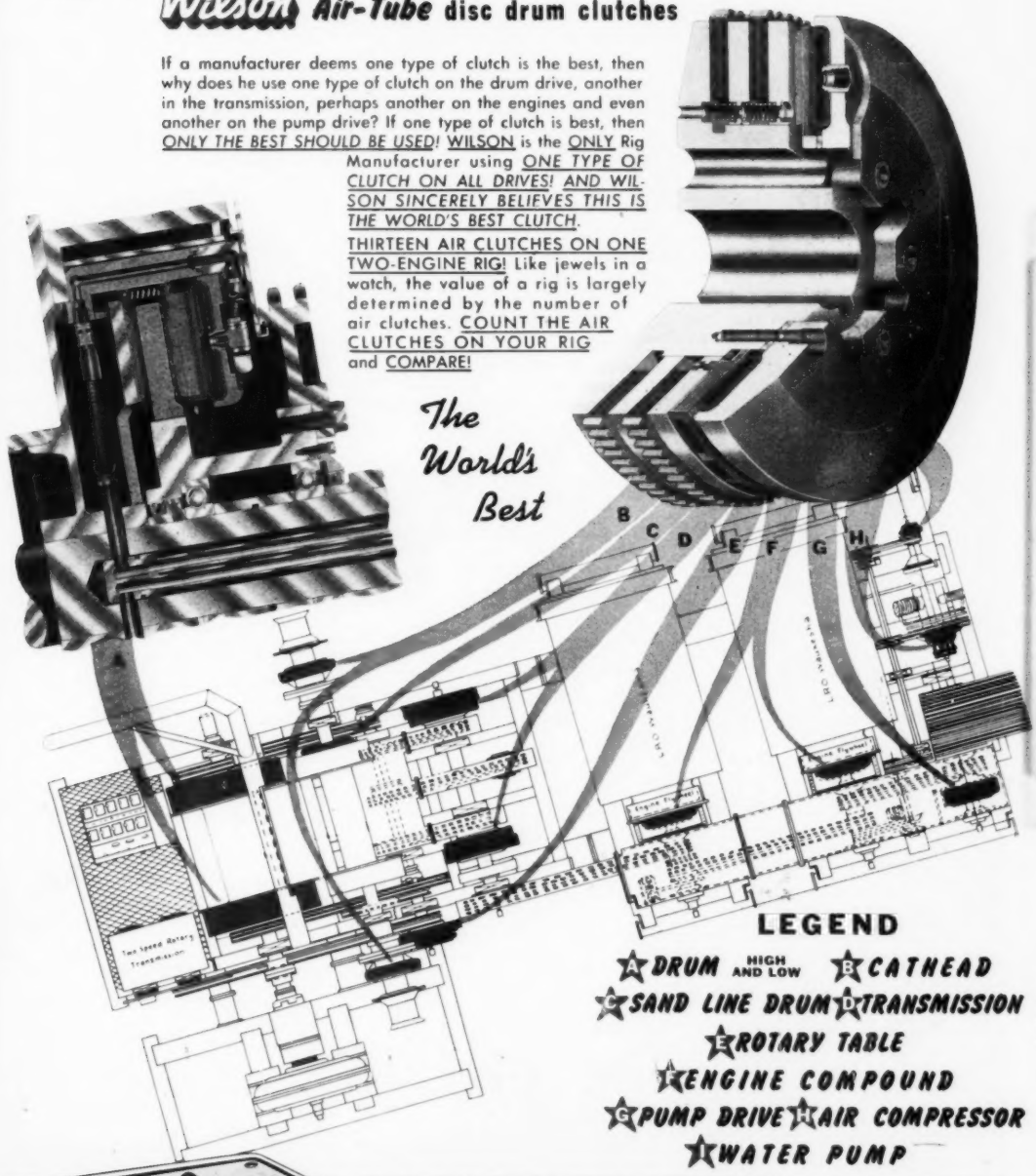
**WICHITA Air-Tube disc clutches**

**with... Wilson Air-Tube disc drum clutches**

If a manufacturer deems one type of clutch is the best, then why does he use one type of clutch on the drum drive, another in the transmission, perhaps another on the engines and even another on the pump drive? If one type of clutch is best, then *ONLY THE BEST SHOULD BE USED!* WILSON is the ONLY Rig Manufacturer using *ONE TYPE OF CLUTCH ON ALL DRIVES! AND WILSON SINCERELY BELIEVES THIS IS THE WORLD'S BEST CLUTCH.*

THIRTEEN AIR CLUTCHES ON ONE TWO-ENGINE RIG! Like jewels in a watch, the value of a rig is largely determined by the number of air clutches. COUNT THE AIR CLUTCHES ON YOUR RIG and COMPARE!

*The World's Best*




**LEGEND**

A DRUM HIGH AND LOW — B CATHEAD
C SAND LINE DRUM — D TRANSMISSION
E ROTARY TABLE
F ENGINE COMPOUND
G PUMP DRIVE — H AIR COMPRESSOR
I WATER PUMP

Wilson

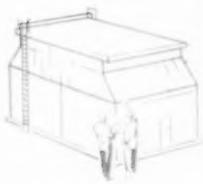
**MANUFACTURING CO., Inc.**

WICHITA FALLS, TEXAS

## make your own comparison...

# a Fluor-GR Fin-Fan

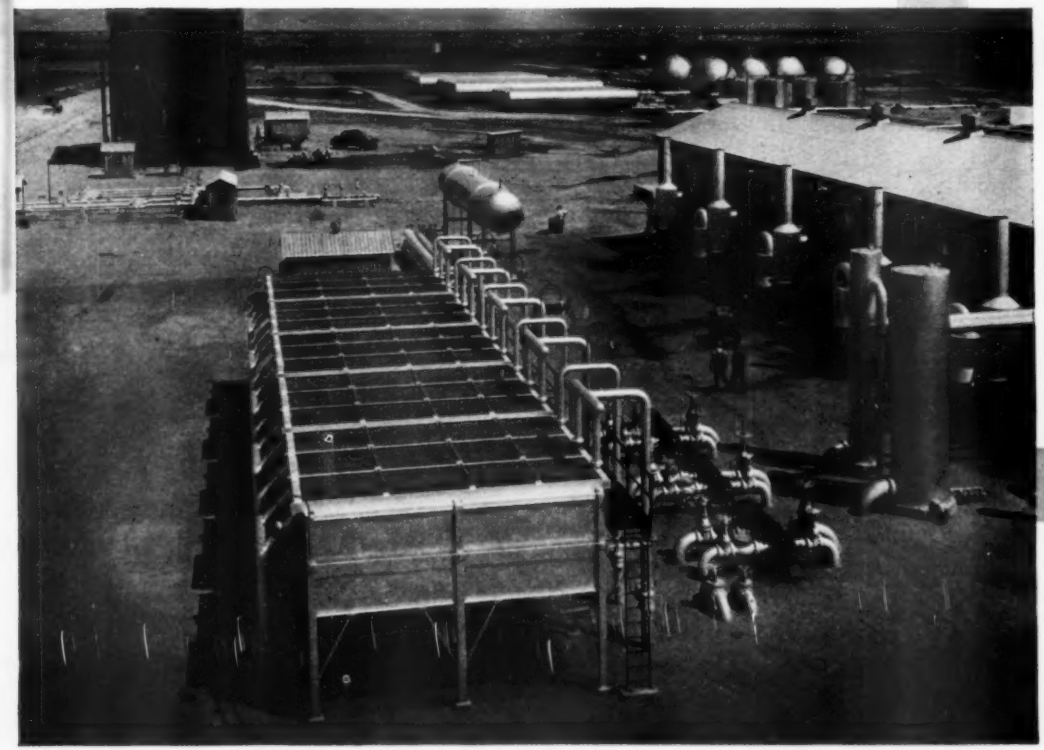
## against any other air-cooled heat exchanger

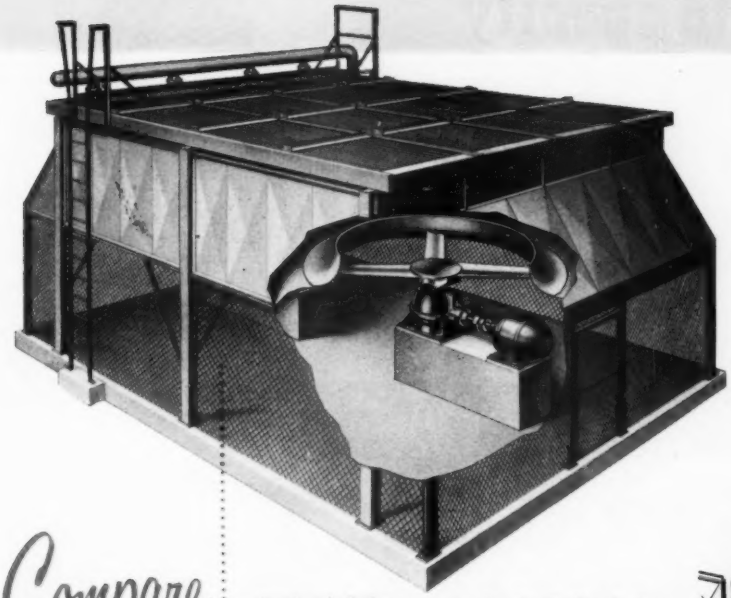


When considering air-cooled heat exchanger equipment, compare the advantages of a Fluor-GR Fin-Fan. Make comparisons of structural simplicity and flexibility. Compare the exclusive features of the K-Fin section, the rugged yet precision design of all mechanical equipment. Check *proven performance* in such varied services as gas transmission systems, petroleum refineries, light hydrocarbon processing plants, chemical processing plants, and power and industrial plants.

The Fluor-GR Fin-Fan was *pioneered* by The Fluor Corporation and the Griscom-Russell Company. It was the *first* of this type heat exchanger to be developed for industry. Fluor, with its wide experience in the theory, design, and fabrication of air-moving systems, and Griscom-Russell, with its long experience in heat transfer, *continue* to lead in the development and refinement of air-cooled heat exchanger equipment.

Before you buy or specify, compare the Fluor-GR Fin-Fan. A Fin-Fan provides more exclusive design features—features that add up to *efficient, dependable* performance —than any other make of air-cooled heat exchanger. Write for Fluor Bulletin No. FF-8501.



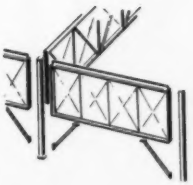


*Compare*

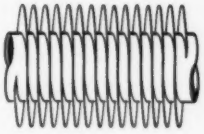
*Compare*

*Compare*

**structural design** – Structurally, the Fin-Fan is the ultimate in simplicity and flexibility. Its "truss-type" design provides a rugged, vibrationless unit, free of extraneous parts. Uniform prefabrication of parts, with bolt holes and orientation *incorporated* in basic design, permits easy extension without shut-down of existing units!



**K-Fin features** – G-R K-Fins are tension-wound for *moderate* temperatures, rolled into grooves for *elevated* temperatures. Threaded header plugs provide quick, easy access to tube ends for cleaning or replacement. Plugs are shoulder-tight to form a leakproof metal-to-metal joint at all pressures, independent of thread tightness.



**mechanical equipment** – Fluor mechanical equipment is ruggedly designed to meet specific heat transfer requirements. 4 basic gear units cover 4 different and distinct horsepower ranges. This, coupled with a choice of fan assemblies ranging from 8′ to 20′ in diameter, with 4 or 6 blades per fan unit, enables the *proper* combination of gears and fans to effect optimum efficiency.

*Compare*

**proven performance . . .**

More Fluor-GR Fin-Fan Air-Cooled Heat Exchangers are in service throughout the continental United States and in countries abroad than any other make. More Fluor-GR Fin-Fan installations are the result of repeat orders than any other type. Check with your nearest Fluor Representative for the Fin-Fan's outstanding record of proven performance – in services and duties similar to your own!

**FLUOR**

*Engineers - Constructors - Manufacturers*

THE FLUOR CORPORATION, LTD., 2500 S. ATLANTIC BLVD., LOS ANGELES 22, CALIF.
New York, Chicago, Pittsburgh, Boston, Tulsa, Houston, San Francisco, Birmingham and Calgary

Represented in the Sterling areas by:
Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1., England

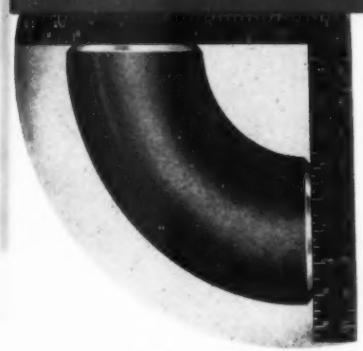
# It pays to specify MIDWEST WELDING FITTINGS

The accurate, uniform dimensions of MIDWEST Welding Fittings accomplish three important things:

1. **Save time in lining up pipe and fitting.**
2. **Save welding time.**
3. **Result in better welds.**

Qualified pipe welders carry a torch for your good judgment when you specify MIDWEST.

MIDWEST

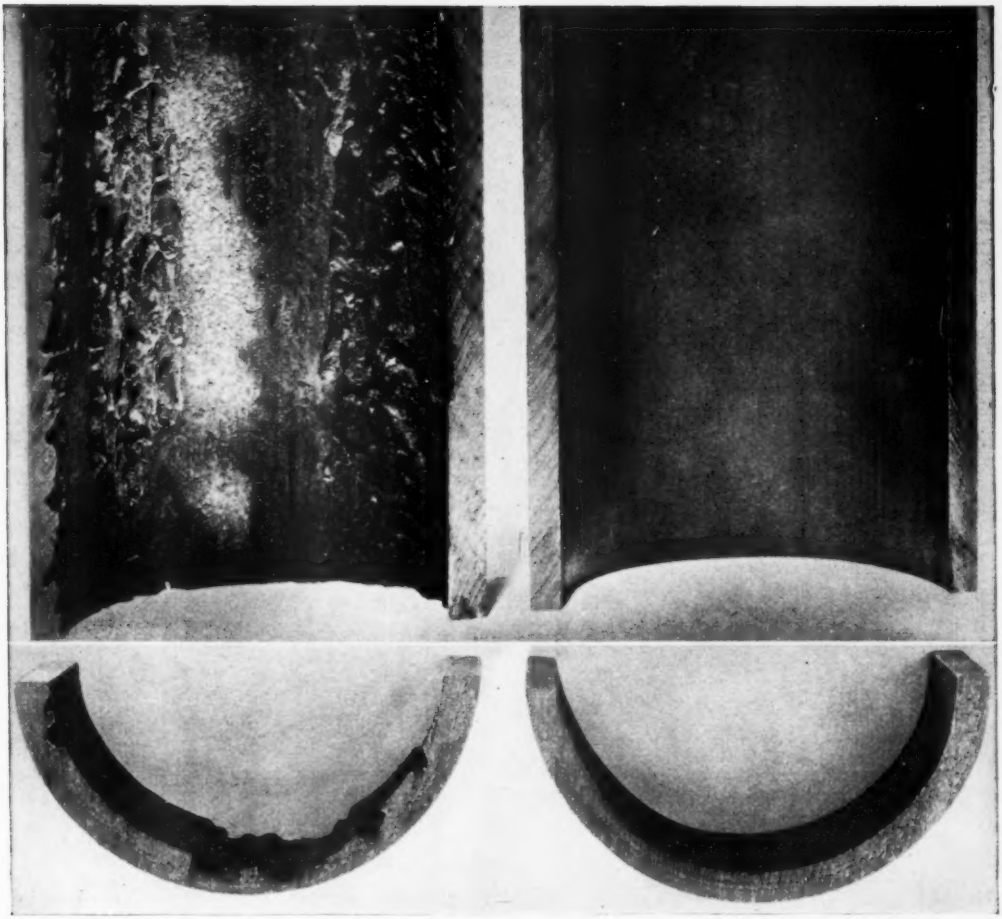


MIDWEST makes the most varied line of welding elbows on the market. ASA standard; Midwest "Long Tangent"; short radius, recommended where space limitations do not permit use of "Long Tangent" or ASA elbow; Midwest reducing, which takes the place of a straight size elbow and a reducer. Eliminates one weld and reduces pressure drop.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

*Jones & Laughlin Supply Company*

J&L STEEL



# Don't Let Corrosion Steal Your Steel!

A major oil company coated the inside of 4-inch steel tubing with finishes based on VINYLITE Brand Resins. Each day, for five months, the pipe carried 100 barrels of oil and 5,000 barrels of high-iodine-content salt water. It was directly coupled to an uncoated pipe.

*The coated pipe (right) suffered no measurable damage. The uncoated pipe (left) corroded as deeply as a quarter of an inch — two-thirds of the way through the pipe.*

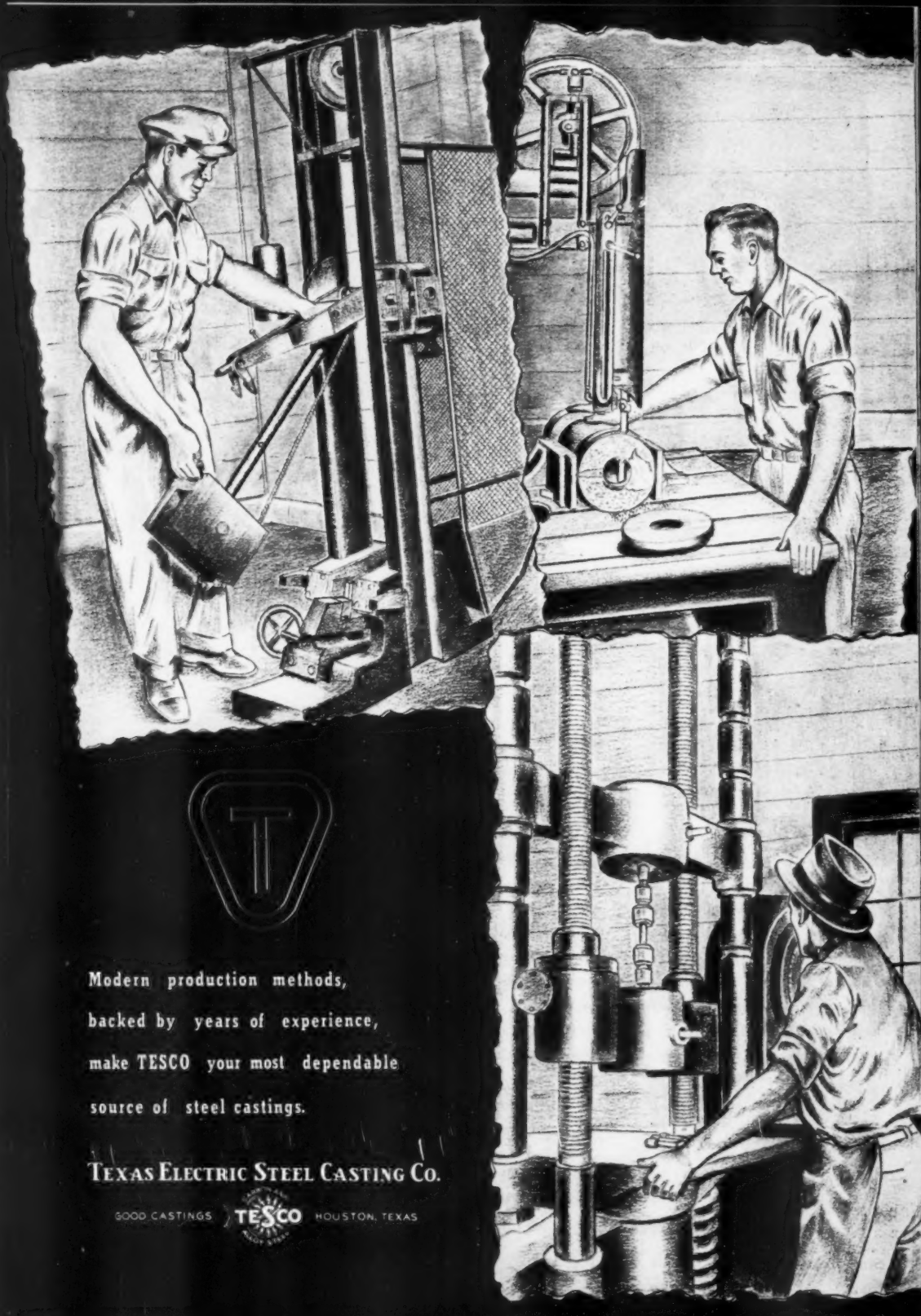
Preserving metal and slashing maintenance costs, coatings based on VINYLITE Resins are widely used today in the petroleum, chemical, and processing industries...because they resist water, salt air, industrial atmospheres, oils, greases, alkalies, most strong acids, sunlight, heat, cold. Odorless, tasteless, non-flammable, they protect containers from contents, contents from containers.

We'll gladly send you a list of suppliers of metal, concrete and masonry coatings based on VINYLITE Resins. Write Dept. KX-68.

**Vinylite**
BRAND
**RESINS**

TRADE MARK

**BAKELITE COMPANY**
*A Division of*
*Union Carbide and Carbon Corporation*
**30 East 42nd Street, New York 17, N.Y.**



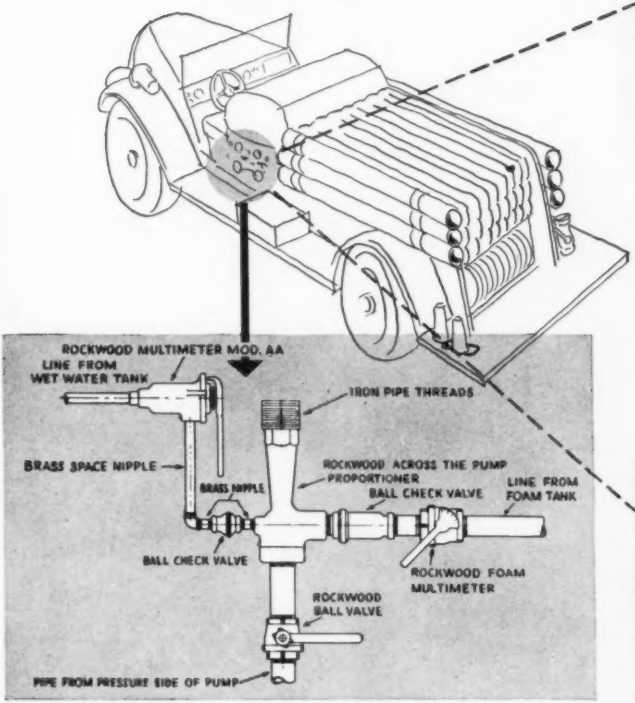
Modern production methods,
backed by years of experience,
make TESCO your most dependable
source of steel castings.

TEXAS ELECTRIC STEEL CASTING CO.

GOOD CASTINGS TESCO HOUSTON, TEXAS

# *Flaming Liquids Stop Short! Water Goes Farther!*

**. . . with Rockwood's action-proved fire fighting aids.**

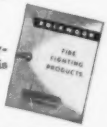



**ACCURATE MIXING ASSURED.** Automatically feeding FOAM or WET Liquids into hose lines, Rockwood's Model Dual "B" Around-the-Pump Proportioner is designed for use where pressure is maintained by a pump from either draft supply or booster tank. Multimeter settings admit proper amounts of wetting agent for varying nozzle discharges and solution strengths.

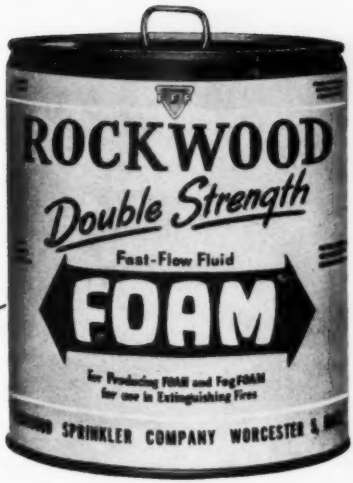
## A proportioning system to meet YOUR needs.

Different types of fires call for different proportioning systems for large-volume FOAM or WET discharge. Rockwood specializes in custom-engineered proportioning systems to meet particular needs, for all mobile equipment. Write for details.

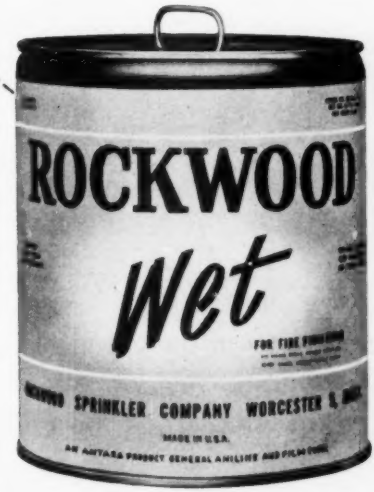
**GET THE FACTS** on Rockwood's complete line of cost-cutting, efficiency-boosting products for modern fire fighting. Send for your copy of this big, illustrated catalog today.



**ROCKWOOD SPRINKLER CO.**
**104 Harlow Street, Worcester 5, Mass.**
**PORTABLE FIRE PROTECTION DIVISION**




**TO PUT OUT FIRES IN FLAMMABLE LIQUIDS FASTER AND AT LOWER COST,** use Rockwood's new Double Strength FOAM Liquid. Three parts of FOAM Liquid mixed with 97 parts of water form an excellent foam blanket that will quickly re-seal if broken. This foam blanket has proved its ability to extinguish large spill fires in gasoline with maximum speed and safety to firemen. Double Strength FOAM Liquid is more fluid, faster spreading and flows freely at sub-zero temperatures (—15°F.). Rockwood Regular FOAM Liquid is also available for use with Rockwood devices.




**TO MAKE A LITTLE WATER GO A LONG WAY,** use Rockwood WET, a wetting agent prepared especially for fire fighting. WET speeds the spread and penetration of water into deep seated fires in such ordinary combustibles as wood, paper, cloth, etc. Thoroughly tested in action, a mixture of 1 part WET to 99 parts of water will help reduce the time, manpower and quantity of water needed to put out the stubbornest fires. WET retains its remarkable penetrating quality even at fire temperatures.

# Superior Service
## is our STOCK IN TRADE

It is only a matter of minutes from the time our teletype receives your order, until it is filled, tagged and ready for shipment...

**THAT'S WHAT WE MEAN BY SUPERIOR SERVICE!**

SUPERIOR

IRON WORKS & SUPPLY COMPANY, INC.

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# AXELSON

*Chosen first... TO LAST!*

**INCREASED PRODUCTION**

**LESS DOWN TIME**

**LONGER PUMPING LIFE**

**LOWER PUMPING COSTS**

There is an Axelson Deep Well Plunger Pump for each specific well condition. Ask an Axelson expert.

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

AXELSON MANUFACTURING CO. • PLANTS Los Angeles 58, St. Louis 16. • OFFICES New York City 7, Tulsa 1, Buenos Aires, Argentina, Caracas, Venezuela. • DISTRIBUTORS Jones & Laughlin Supply Co., Great Northern Tool & Supply Co., Industrial Agencies, Ltd., San Fernando, Trinidad, B.W.I., Industrias Weidrup & Campbell, Barcelona & Maracaibo, Venezuela, Dominion Oil Field Supply Co., Ltd., Calgary, Canada, South American Supply Co., Avenida Tacna 592, Lima, Peru.

# *How can you benefit*

# from these 34 major pipelines?

How? By applying to your future operations the electrical features developed for these 34 major oil and gas lines. Westinghouse is the source for this information.

### *Centralized automatic control*

For example, in one new Westinghouse-equipped pumping station, centralized automatic control has been applied. The mere pressing of three buttons by a single employee, performs twelve operations in six minutes, that would normally take two or three men an hour. The savings in manpower and increase in revenue through fast starting are tremendous. And there's no chance of damage through opening valves in the wrong order.

### *Highly flexible and reliable operation*

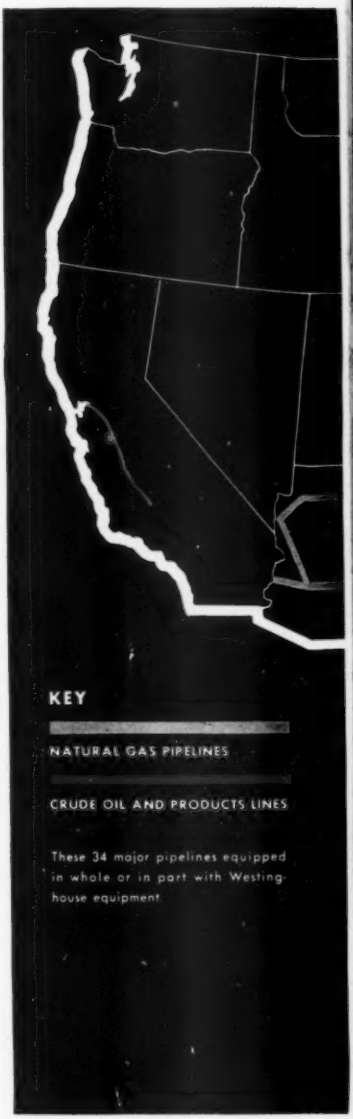
Electrical control has been developed that makes it easier to maintain operating schedules. With such control, all pumping stations can be more easily operated in step. This eliminates the need for storing successive pumpings in balance tanks with the resultant interbatch contamination.

### *Advancements in Power Systems*

Westinghouse has made major advancements in Power Systems for pumping stations. All high-voltage equipment can be enclosed in metal-clad switchgear. This saves installation dollars, makes maintenance more convenient, and provides the ultimate in safety to personnel. The low-voltage circuit breakers and motor controls are centralized in compact Control Centers.

### *Call Westinghouse early when you plan*

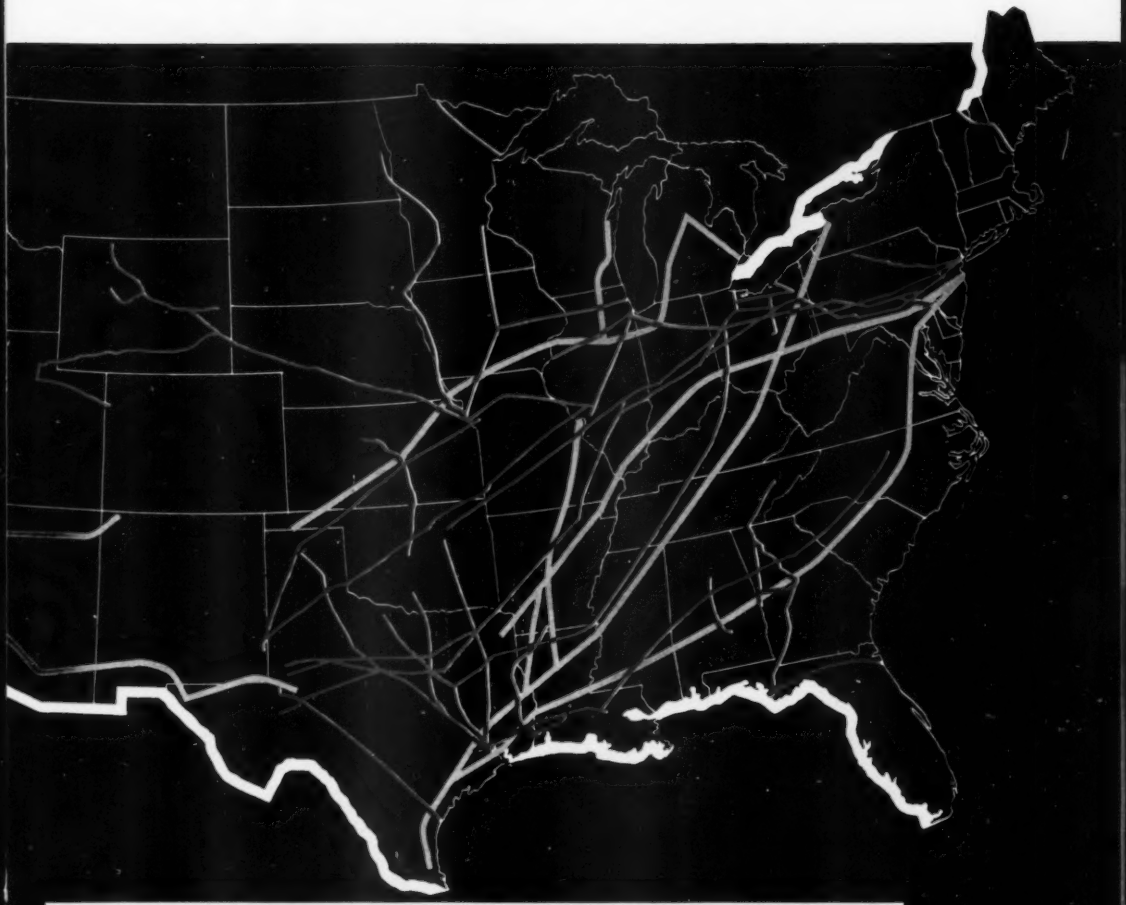
The experience gained in equipping these 34 lines is invaluable. Interest in remotely operated and automatic pumping stations is increasing and it's interesting to note that 20 years ago Westinghouse equipped the first pipeline pumping station for remote supervisory control. And Westinghouse Engineers are continually working on new developments to minimize the cost of pump station attendance. When your next job comes up, call Westinghouse early in the planning stage. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Penna. J-94883

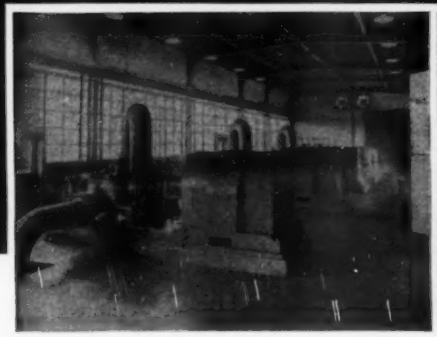

KEY
NATURAL GAS PIPELINES
CRUDE OIL AND PRODUCTS LINES
These 34 major pipelines equipped in whole or in part with Westinghouse equipment

YOU CAN BE SURE.. IF IT'S

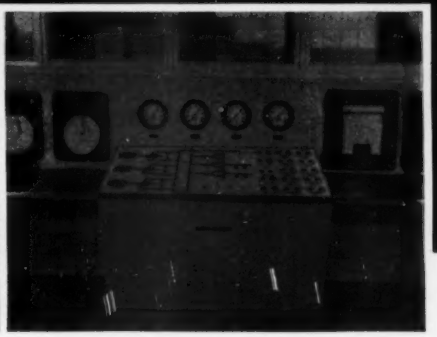
Westinghouse

EQUIPMENT FOR THE PETROLEUM INDUSTRY

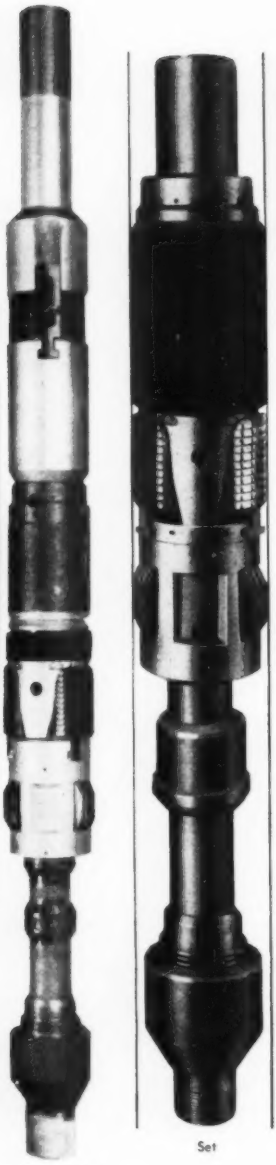




A group of 1,250-horsepower forced-ventilation motors installed in a pumping station of a large crude oil pipeline. All units, including the suction and discharge valves and the ventilation blowers, are remotely operated by a sequence control system.



Pressing buttons on this control desk starts the main pumps and operates valves. Indicating lights show valve position. Other lights identify the operation of protective devices which warn of abnormal conditions. Buttons at right control booster pumps.



With Hold-down

Set

# IT ISN'T LUCK

# IT'S THE PACKER

## that gets the JOB DONE!

## THE WILSON Type "MB" METAL BLOCK PACKER

### CANNOT COLD FLOW

The majority of all Packer failures are caused by the element "failing to hold."

This cause of failure has been positively eliminated in the WILSON type "MB" - Metal Block Packer.

Overlapping steel segments that come directly in contact with the casing right below the element totally confine the rubber between the casing, the top of the "Metal Block" and the Mandrel of the Packer.

These steel segments expand against the casing at the same time the slips are set.

The Wilson type "MB" Packer with Hold-down is especially successful where pressure below the Packer exceeds the pressure above.

You can set the Wilson type "MB" - Metal Block Packer—AND KNOW IT WILL HOLD.

***Ask your supply store for this outstanding Packer or write:***

## WILSON FOUNDRY & MACHINE CO.

1417 Elysian St.

HOUSTON, TEXAS

*integrity*

# Avondale

*service...*

*famous in the Oil Industry*

*A company is not only famous for what it does—but also for how it does it! AVONDALE has constructed, repaired, and fabricated for the Oil Industry for many years. AVONDALE barges, towboats, tugboats, drilling barges, personnel launches and offshore drilling platforms have made a name for themselves within the Oil Industry as being tops in Quality and Performance. But that's not all! AVONDALE'S satisfied customers within the Oil Industry, both large and small companies, are proof that AVONDALE integrity, the manner in which AVONDALE carries out a job to the letter, to the complete satisfaction of the customer, is something that has made customers return to AVONDALE time and again. Couple those two words, Integrity and Service, and you have the ultimate in what the Oil Industry needs and wants from a company rendering Service to them . . . . . .*

*Offshore Drill Rig*

*125' MV "JOAN E."*

*Oil Cargo Barge*

## AVONDALE MARINE WAYS, Inc.

**MAIN PLANT: AVONDALE, LA. • QUICK REPAIR PLANT: HARVEY, LA.**
**SERVICE FOUNDRY DIVISION (SERVICE FOUNDRY): NEW ORLEANS, LA.**

INSIST ON
THE ORIGINAL

UNMATCHED

"KING-CLIP"
VALVE

AVAILABLE IN 21 PATTERNS
FOR HUNDREDS OF SERVICES

Install the original Lunkenheimer "King-clip" wherever you need small and medium-size iron gate valves built to stand up under hard usage. It has been paid the high compliment of imitation — but is still unparalleled for workmanship and outstanding features. The distinctive steel clip provides unusual strength; the hand wheel has extra torque for easier, tighter closing; the famous Stemalloy* bronze stem travels in a special bronze bushing — never touches iron. Both Iron-Body-Bronze-Mounted and All-Iron designs are available. Ask your distributor for details.

IRON • STEEL • BRONZE

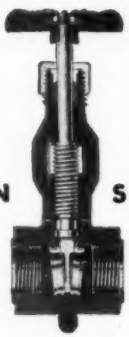


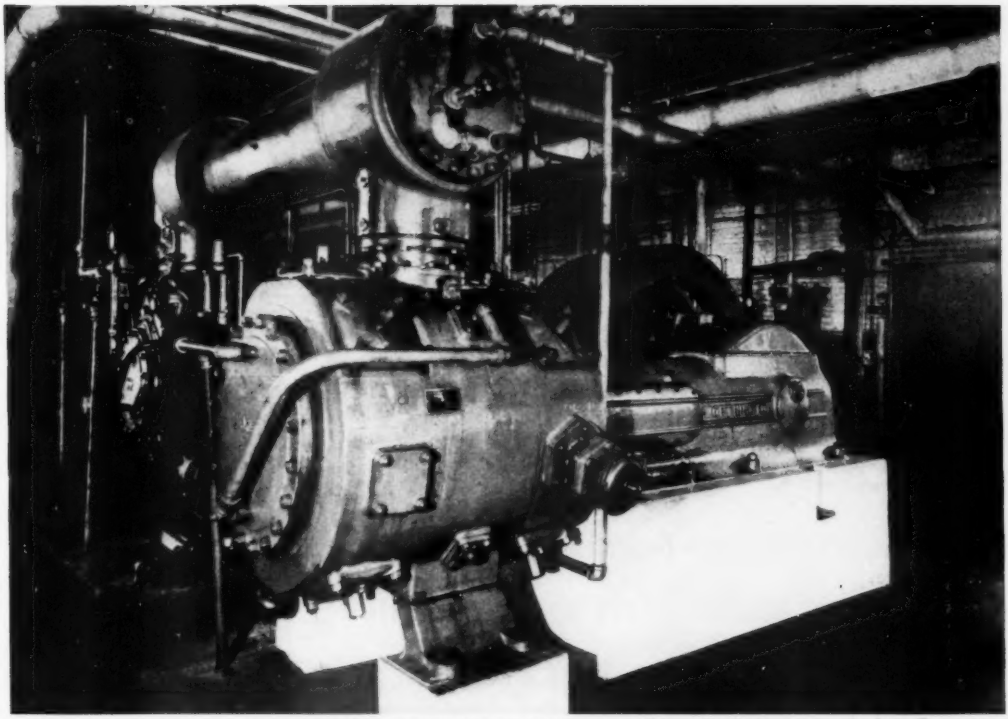
Fig. 1640
I. B. B. M.

WRITE FOR "King-clip" Circular 561, which will help you select the right "King-clip" Valve for your specific piping problem. The Lunkenheimer Company, Box 360F, Cincinnati 14, Ohio.

* Patented Alloy

LUNKENHEIMER
THE ONE Great NAME IN VALVES

L-252-B



ONE OF FOUR WORTHINGTON GAS COMPRESSORS in the gas distribution system of a large Eastern gas company. Compressor is positive displacement reciprocating type with capacity of 125,000 standard cu ft of manufactured gas per hour. Maximum discharge pressure is 100 psi. Volume is controlled by Worthington's automatic variable capacity control.

# When a large Eastern gas company needed another gas compressor...

... There was no question about which make should be selected!

The gas compressor in the picture had been working so well since 1949 that Worthington was the logical choice for the *next* new compressor to handle expanded capacity.

These Worthington features constantly increase the number of such choices:

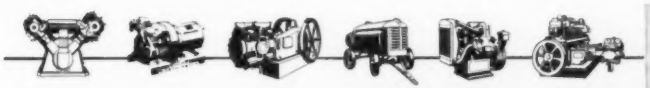
*Accurate control of volume* that is always assured with Worthington's automatic variable capacity control — acknowledged most accurate, flexible and simple control obtainable.

*Worthington's exclusive Feather* Valve* — simplest, lightest, most efficient ever made—eliminates valve problems. And Worthington's high-efficiency intercooler needs less water, less power, less attention.

Somewhere in the broad line of Worthington compressors, for air, gas or other "compressables", there is the one right type and size for your job. *Worthington Pump and Machinery Corporation, Compressor Division, Buffalo, N.Y.*

*Reg. U. S. Pat. Off.

K.2.15

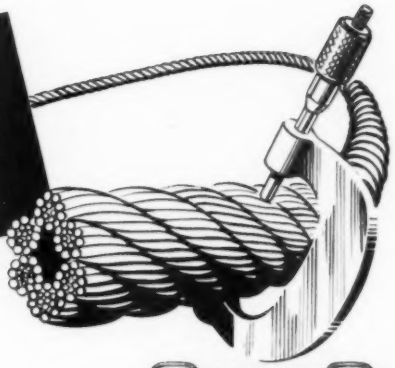



**WORTHINGTON**

Compressors

**No Other Compressor Will Outperform a Worthington**

# Do the Larger Drilling Lines Used in Deep Drilling Cause You Trouble?



**Martin-Decker designed the Type "E" Anchoring Weight Indicator for use on 1¾" and 1½" cable in anticipation of the trend toward using larger drilling lines for deeper drilling. This development has resulted in much longer cable life. The greater diameter snubbing drum on the Type "E" Wire Line Anchor is a necessity in the larger diameter cables and the Type "E" Wire Line Anchor Weight Indicator combination, designed especially for this service, provides a better Weight Indicator which is outstanding for its**

## Accuracy — Sensitivity — Dependability — Ruggedness

## THE TYPE "E" MARTIN-DECKER WEIGHT INDICATOR

is positively unaffected by atmospheric temperature changes and accuracy is unimpaired by small amounts of air in the system, leaks or fluid volume. It shows the Weight-On-Bit by the magnified Vernier method. (Set the NET-WEIGHT-ON-BIT-DIAL on zero and read.) All readings are shown directly in pounds.

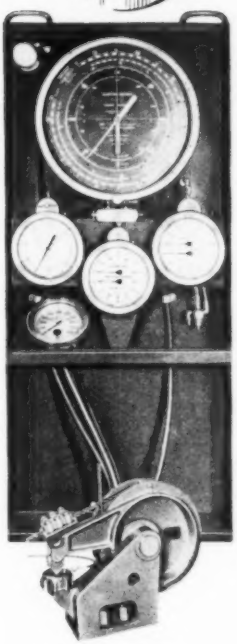
## Features...

**A CONVENTIONAL WEIGHT INDICATOR** for Total Weight of the Drill String—showing tight hole, stuck pipe, load on derrick, etc. Every weight indicator need is wrapped up in one dependable package.

**A SIMPLE RECORDER** gives the engineer a permanent record of each 24 hours of operation. The Gauge is placed in front of the driller where the slightest change in hook load or bit weight is instantly revealed.

**HYDRAULICALLY OPERATED**—positively unaffected by atmospheric changes. Dead line whip can neither affect Weight Indicator reading or damage the instrument.

**REQUIRES NO ADJUSTMENT** for Number of Lines Strung *or* Cable Diameter. No Gadgets or Shims to Get Lost. Built-in illumination provides greater safety and convenience. Furnishes precise WEIGHT-ON-BIT DIRECTLY IN 1,000 LBS., and also hook load and derrick load DIRECTLY IN POUNDS.



*The Master Drilling Control Instrument*

**The Type "E" Martin-Decker Weight Indicator and National Ideal Wire Line Anchor has greater size, massiveness and strength needed to care for 1¾" and 1½" wire lines and dead line loads up to 90,000 lbs. as required by super rigs.**

**Friction has been virtually eliminated from the system by the design of the Type "E" Wire Line Anchor, as is the case with the Type "F" and "D." It is comprised of two main elements, a 28" diameter drum and base, both of which are heavy steel castings for strength and safety. The drum is spirally grooved for a maximum wire line diameter of 1½", providing greater contact surface for wire line wraps.**

### OTHER OUTSTANDING ADVANTAGES

- Equally spaced gauge graduations
- No adjustments
- Safe, vapor-proof light
- Non-glare dial
- Extremely sensitive
- Sealtite construction
- Unaffected by wire line size or number of lines strung
- Adjustable sensitivity
- Saves wire line
- Simple installation

**Write for Literature**

HOME OF THE WEIGHT INDICATOR

**MARTIN DECKER CORP.**

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY: T. P. CULLEN, BAKERSFIELD, CALIFORNIA
MID CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS
CANADIAN DISTRIBUTOR: REED ROLLER BIT COMPANY OF CANADA, LTD., CALGARY & EDMONTON, ALBERTA

MARTIN-DECKER WEIGHT INDICATORS AND IDEAL WIRE LINE ANCHORS ARE ALSO SOLD THROUGH THE NATIONAL SUPPLY EXPORT CORP., THE NATIONAL SUPPLY CO. AND OTHER RECOGNIZED SUPPLY HOUSES.

*"Some 15,000 employees in all branches of our organization are taking advantage of the Payroll Savings Plan..."*

**SPENCER LOVE**
Chairman of the Board, Burlington Mills

*"The Payroll Savings Plan is one of the important personnel services offered to the employees of our company. At the present time some 15,000 employees in all branches of our organization are taking advantage of this splendid plan for systematic savings. In times of national emergency this plan assists in stabilizing the economic life of the employee, the community and the nation."*

Last call for the 1951 Defense Bond Campaign!

While the campaign was scheduled for six weeks, beginning Labor Day, the *accounting period* will include all Payroll Savings Plan bond purchases and enrollments in September *and October*.

If *you* haven't conducted a person-to-person canvass to put a Payroll Savings Blank in the hands of every man and woman in *your* company there is still time to join the thousands of companies which have added nearly a million employees to the Payroll Savings Plan through person-to-person canvasses.

Phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will give you all the help you need—application blanks, posters, envelope stuffers, personal assistance.

Give your employees an opportunity to save for their future and at the same time, help to maintain America's economic security—put an application blank in their hands.

**Results of a few recent person-to-person canvasses**

Firestone Tire and Rubber Company (40,000 employees), 87% participation; Universal Atlas Cement Company, 67.8% of 4,789 employees . . . Martha Mills, 71% of 2,200 employees . . . Lit Brothers, 52% of 3,600 employees . . . Delta Air Lines, 65% of 2,100 employees; Aerojet Engineering Corporation, 78.1% of 2,000 employees . . . Brown-Lipe Chapin Division of General Motors, 87% of 1,750 employees; Fabricast Division, General Motors, 85% of 1,700 employees.

**Person-to-person canvasses now under way include:**

| | Number of Employees |
|---|---|
| 38 Major Railroads | 993,142 |
| Radio Corporation of America | 40,000 |
| Owens-Illinois Glass Company | 25,000 |
| Cudahy Packing Company | 17,000 |
| Pacific Gas and Electric | 17,000 |
| Willys-Overland | 6,750 |
| Owens-Corning Fiberglas Corp. | 6,500 |
| White Motor Company | 6,300 |
| Fruehauf Trailer Company | 5,700 |

*The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and*

**THE OIL AND GAS JOURNAL**
**TULSA 1, OKLAHOMA**

# Oil-Field Standouts

ALL-ROUND usefulness combined with dependable operation — that's one big reason why Bucyrus-Erie rigs are oil field standouts. They're ready to tackle dozens of jobs — trenching, uncovering pipe line leaks, building access roads, leveling at location, digging slush pits, handling drill pipe, moving and erecting equipment. And where speed is vital and lost time costly, Bucyrus-Erie reliability puts you profits ahead.

The day-after-day, year-after-year service records of these outfits don't just happen. Here are some "reasons why" behind Bucyrus-Erie performance:

1. Parts are simple, large, few in number and enduringly aligned — there's little to go wrong.

2. All adjustments are easily made — and they last!

3. Machinery is accessible for quick, easy service, parts replacement and lubrication.

4. Digging cycle is balanced, coordinated, fast. No overstressing of parts to cause too-frequent adjustment and repairs.

5. Controls are conveniently grouped in one place — no lost motion from hopping around.

6. Generous use of antifriction bearings makes performance smooth, quiet, easy on machine and operator.

7. Design is individual — each machine matched to its range of work.

8. Moves are fast, sure. Machine steers easily, makes sharp or gradual turns, climbs grades to 30%.

See your Bucyrus-Erie distributor for more details on this outstanding ⅜- to 4-yard line of gasoline, diesel and single-motor electric excavators.

**MOST COMPARED . . .**
**MOST PREFERRED**

SOUTH MILWAUKEE BUCYRUS ERIE WISCONSIN

# H.P. pipe gaskets like these *made to your order* by gasket specialists...

## ...to save you both time and money

When you need metallic gaskets for high pressure piping, put the job up to Johns-Manville Goetze Gasket specialists. You benefit in many ways:

You get the exact gaskets you need for maximum efficiency under *your* operating conditions, tailor-made to fit *your* equipment. You get the savings in cost made possible by intensive specialization and modern production tooling. And you get the full benefit of over sixty years' experience in designing specialized metallic gaskets for industry's most complex sealing requirements.

Typical styles of Johns-Manville Goetze Gaskets that have been made to order for high pressure piping service are shown above. The flare type gasket with bellows action and the solid flare type are particularly suited for pressures above 5000 psi; the profile and V-Tite gaskets are generally used for lower pressures. Each of these is fabricated to extremely close tolerances. Other styles can be made to any desired cross section to meet your individual requirements.

For more information about Johns-Manville Goetze Gaskets, write for your copy of Catalog PK-35A. Or send us your drawing or template for an immediate quotation. Address: Johns-Manville, Box 290, New York 16, N. Y.

**Johns-Manville *Goetze* GASKETS**

THERE'S A JOHNS-MANVILLE PACKING AND GASKET FOR EVERY SERVICE

No. 2 in a series of advertisements on the BIW Non-Lubricated Gate Valve.

# SIMPLE DESIGN

## means Longer Life and less maintenance - Proved by more than 30,000 Valves in Christmas Tree Service

**BIW**

**NON-LUBRICATED GATE VALVE**

Oil — Water — Gas to 5000 pounds W P

**BEAUMONT IRON WORKS CO.**
**BEAUMONT, TEXAS**
A Subsidiary of American Locomotive Company
Atlas Engineering Works, exclusive sales agents

# Concord #20 Steam Hose

FLEXIBLE

Tough

Dependable

Illustration shows how special built-in lining of stainless steel inner wire braid assures long life under the most severe operating conditions.
Pat. applied for

BWH Concord #20 Steam Hose has a protective built-in lining of stainless steel wire braid that guards against tube swelling . . . assures dependable, long-lived service.

This rugged, braided inner lining assures maximum steam flow . . . permits easy recoupling in the field.

Other Concord #20 construction features: two or three braids of alternate high tensile steel wire and rubber layers firmly bonded over outside of tube. These provide maximum burst-protection and safety. An asbestos braid provides positive cover adhesion and acts as cover insulator. A durable, abrasion-resistant cover withstands severest abuse.

Put Concord #20 Steam Hose to work for *you — now!*

*Another Quality Product of*

**BOSTON WOVEN HOSE & RUBBER COMPANY**

**Distributors in all Principal Cities**

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

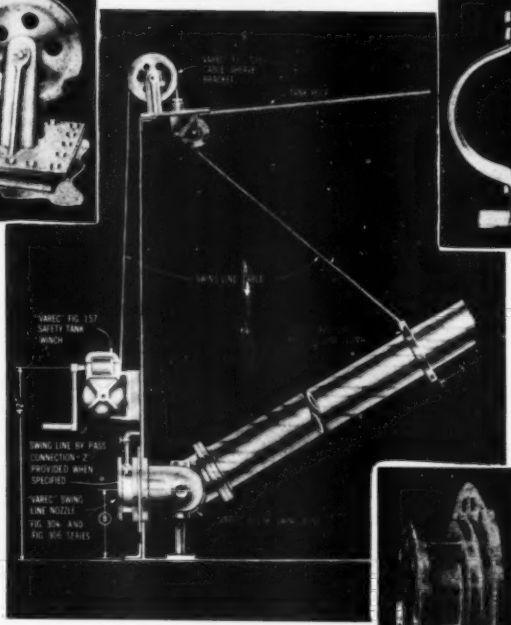
BWH
DEPENDABLE RUGGEDNESS

# For A Safe, Serviceable Swing Line Assembly

**SPECIFY** "Varec" PROVED and APPROVED **EQUIPMENT**

*"VAREC" Cable sheave Bracket equalizes pull in both directions. Pull is straight down on either side to eliminate all angularities.*

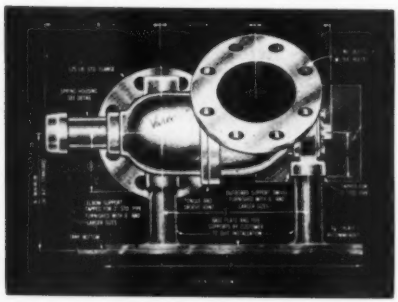
*"VAREC" Cable Collar Clamps provide a simple, fool-proof means of connecting swing line cable to swing line pipe.*


"VAREC" FIG. 157 SAFETY TANK WINCH
SWING LINE BY PASS CONNECTION-2" PROVIDED WHEN SPECIFIED
"VAREC" SWING LINE NOZZLE FIG. 304 AND FIG. 305 SERIES

*"VAREC" Safety Tank Winch dependably sustains loads without use of clutches or dogs. Enclosed worm and gear drive. 1500, 2500 and 5000 lb. capacities.*

*"VAREC" Tank Shell Nozzles provide a rigid, leak-proof connection between inside swing joint and outside valve or pipe line. Extra heavy, hydrostatically tested.*

*"VAREC" Double or Single (shown above) Swing Line Assemblies afford the utmost in safe, reliable and trouble-free operation.*



*"VAREC" Swing Joints facilitate raising and lowering swing lines inside storage tanks. Patented control sleeve prevents elbows from parting under any condition.*

"VAREC" Swing Line Equipment in addition to affording many important operating conveniences is built for extra years of dependable, trouble-free service with safety. Each component part is made with extreme care to eliminate servicing of both internal and external parts.

"VAREC" Engineering Department and Testing Laboratory will gladly collaborate with you on any problems regarding Swing Line Equipment, so when the "specs" say Swing Line, specify "VAREC" for satisfactory service and safety.

"Varec" PROVED and APPROVED

**THE VAPOR RECOVERY SYSTEMS COMPANY**
**COMPTON, CALIFORNIA, U. S. A.**
***Cable Address: VAREC COMPTON USA (All Codes)***
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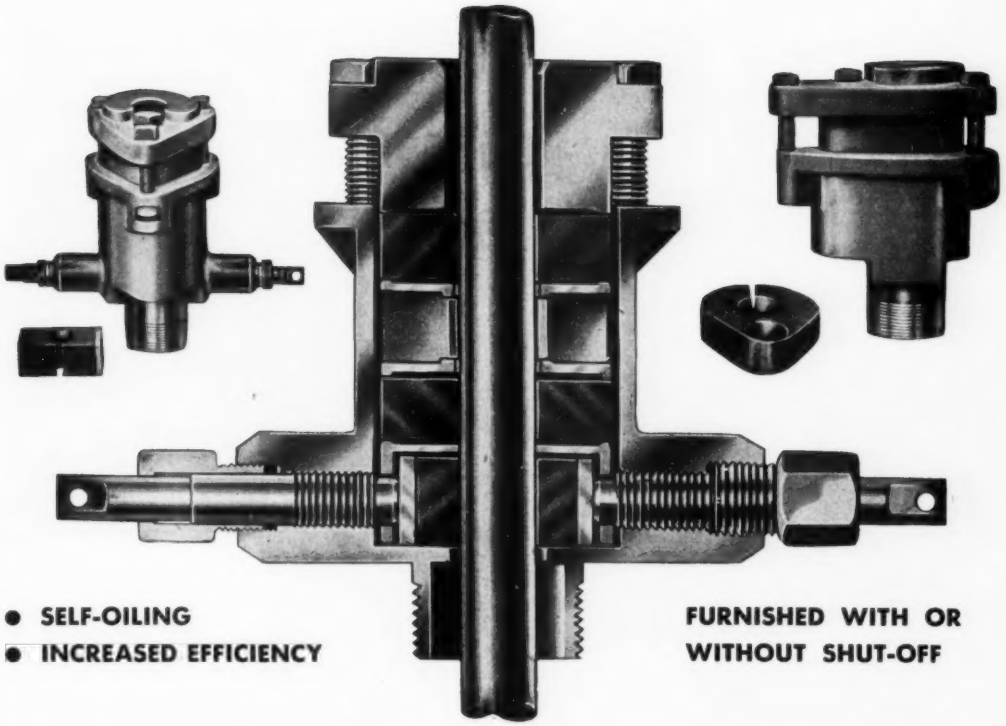


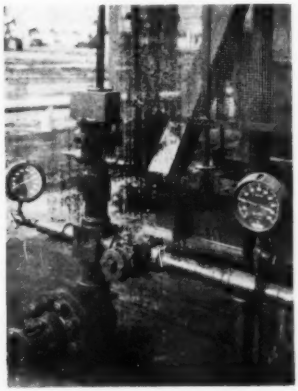
- **SELF-OILING**
- **INCREASED EFFICIENCY**

**FURNISHED WITH OR WITHOUT SHUT-OFF**

# *Ratigan No. 175, No. 176 Stuffing Boxes*

. . . are the only self-oiling units on the market today, receiving their lubrication directly from the pumping well. Both types function exactly the same except that the No. 176 (sectional view above) has a special shut-off feature which makes it possible to shut off while repacking the box. This is accomplished by tightening the screws evenly in the shutoff, although care must be exercised, as the screws must be loosened again before the well starts to pump or the fluid will not get up into the stuffing box.

When the screws are not tight against the rubber, the stuffing box is free to function properly. For a further check on the fluid coming up through the bypass, the pumper may loosen the plug in the cap a little, and if the bypass is free the oil will flow immediately. If the oil does not come through, the screws in the shutoff are too tight. Ratigan Stuffing Boxes are made of high grade electric steel and tested to 3000 pounds pressure. The inside of the box is removable, so that the device has an oil chamber. Another arrangement inside the body keeps this chamber filled with fluid from the well, providing positive self-lubrication. The hole in the rubber is the size of the polished rod, while the hole in the metal parts of the body are larger, making the rod self-aligning . . . another important feature.



## *The Right Combination For Your Pumping Well*

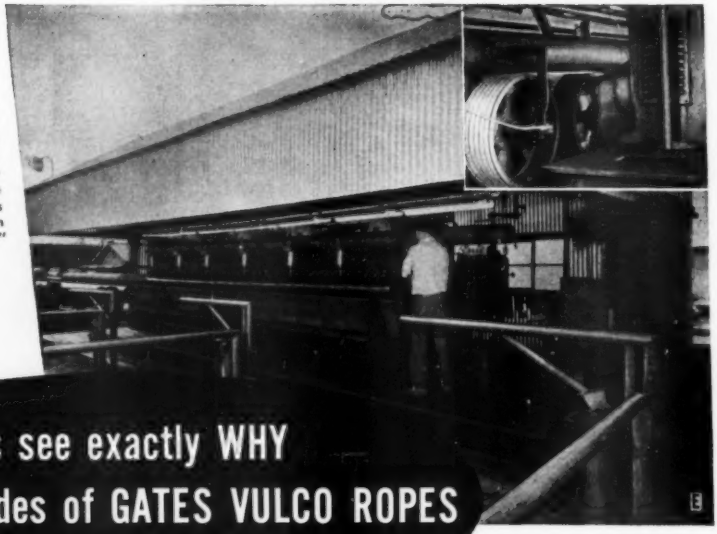
. . . the Ratigan #176-1B Lubricating Cap working as a team with either the Ratigan No. 175 or 176 Stuffing Box (#176 stuffing box shown at left). The lubricating cap lubricates the polished rod when the flow of oil in the tubing is retarded, and the self-oiling stuffing box which lubricates the polished rod with oil from the well when the well is not heading. Send for complete information NOW!

**J. P. RATIGAN, Inc.**

1213 Santa Fe Avenue, Los Angeles 21, Calif.

Export: National Supply Company, Inc., Export Division, 600 5th Avenue, New York 20, N. Y.

***Ratigan Products Are Sold Through Leading Supply Stores***



Forty-eight horizontal spindles carry milling cutters and simultaneously mill 48 slots in a well casing for the Oil Tool Corp., Long Beach, Calif. Mr. Lloyd Osborne, Machine Operator says of the Vulco Rope Drive: "The machine is really smooth now. There is none of the chattering and vibration we used to have."

# Let's see exactly WHY the Concave Sides of GATES VULCO ROPES mean lower V-Belt Costs!

Every engineer knows how a V-belt *changes shape* when it bends around a pulley.

The top of the belt is under tension—making it grow *narrower.*

The body is under *compression,* causing the sides to bulge out!

Look at figure 1-A in the diagrams, herewith. There you see how a *straight sided* V-belt is forced to bulge in its sheave-groove—and this bulging naturally causes extra wear along the middle of the sides as indicated by the arrows.

Now look at the figure 2-A. There you see how the precisely engineered Concave Sides fill out to an exact fit in the sheave groove.

Clearly, the Concave Sides press *evenly* against the V-pulley. This means uniform wear; longer life! The Concave Sides have *full traction;* wear longer because of *full contact!*

**To sum up: The Concave Sides of Gates Vulco Ropes (U.S. Patent No. 1813698) give you (1) Less wear, (2) More pulley contact, (3) More sure power transmitted when needed!**

Only V-belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

**What Happens When a V-Belt Bends**

**Straight-Sided V-Belt**

Fig. 1

Fig. 1-A

**How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.**

**Gates Vulco Rope with Concave Sides**

Fig. 2

Fig. 2-A

**The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!**

CS-521

*World's Largest Maker of V-Belts*

Gates®

Hose V-Belts Molded Rubber Goods

VULCO ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY • DENVER • U•S•A

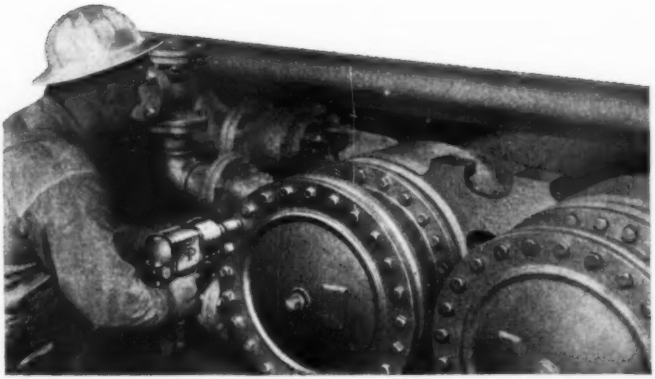
Demco Gland Bushings and Junk Rings
Demco Alloy Steel Pump Studs
Demco Hydraulic Choke Nipples
Demco Rod Oiler
Demco Hydraulic Hose Adapters
GO
DEMCO
DEMCO
"SUPER FINISH"
WASH PIPES
Last Longest!
IT PAYS
Demco Bronze Rods and Liners
Demco Hose Hobbles
Demco's exclusive finishing process provides a mirror-smooth, abrasive-resistant surface which reduces friction — and so lengthens life of both wash pipe and packing. Made from special alloy steel, these wash pipes are uniformly heat treated inside and outside, to absolute maximum hardness — then precision machined! In a recent impartial test by a major oil company, Demco Wash Pipes lasted 5 TIMES as long as other makes.
Demco Rotary Subs
Demco "No Chip" Tong Dies
Demco Auto-Flo Mud Hopper
Demco Standpipe Clamps
Demco Pump Brace and Spacers
Demco Casing & Blowout Preventer Tester
Demco Float Seat Puller

DRILLING EQUIPMENT MFG. CO.
DEMCO
OKLAHOMA CITY, OKLA. U.S.A.

# DRILLING EQUIPMENT MANUFACTURING CO.

General Office & Plant — Oklahoma City, Okla.
P.O. Box 4728 — Phone 62-4475
Export Office: 233 Broadway, New York, N. Y.

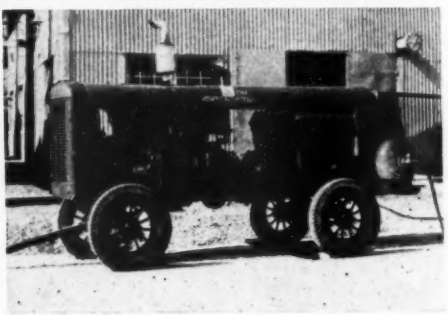
faster nut-running



On scores of maintenance jobs CP reversible AIR IMPACT WRENCHES save precious hours. Powerful, compact, perfectly balanced, with no twisting thrust to fatigue operator. CP Wrenches are furnished in capacities to 1¾" bolt size. Angle head models are available for hard-to-reach nuts, bolts and studs.

# MEANS LESS DOWN TIME

Self-rotating, 7½ pound CP-9 HANDRIL — for drilling holes in masonry, concrete and stone up to 1¼" in diameter — outperforms non-rotating hammer drills of twice its weight. Readily operated with one hand, even for up-drilling. Handles both rotating drill steel and non-rotating chisels or moil points. Ideal for light demolition.



CP PORTABLE AIR COMPRESSORS offer four outstanding advantages: dependability; minimum operating cost; low maintenance; long service life. Gasoline and Diesel driven models are available in capacity range from 60 to 600 cfm.

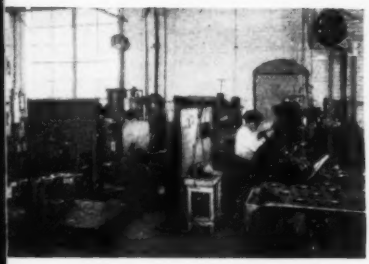
*Write for full information.*

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

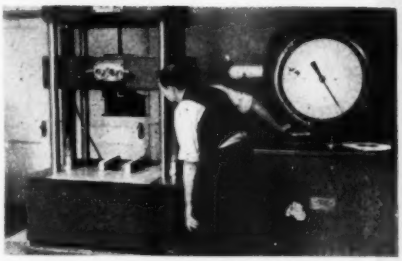
PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

# *Why Grinnell is America's #1 Supplier of* PIPE HANGERS *and* SUPPORTS



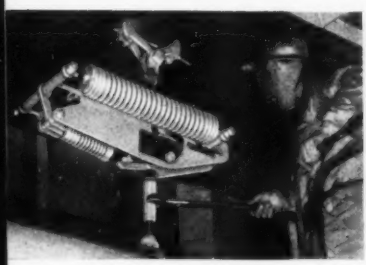
**GRINNELL, ALONE, MANUFACTURES A FULL LINE OF HANGERS AND SUPPORTS**

No other company, anywhere, makes a line as complete or varied. Grinnell produces hangers in thousands of combinations to support any piping.



**GRINNELL, ALONE, MAINTAINS AN EXPERIENCED LABORATORY STAFF OF TRAINED TECHNICIANS**

In its modern, well-equipped laboratory, tests are constantly being made to discover better ways of solving old and new pipe suspension problems.

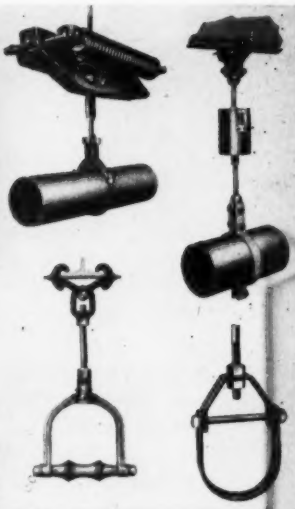


**GRINNELL, ALONE, PROVIDES ENGINEERING ASSISTANCE IN DESIGN AND INSTALLATION**

Grinnell makes available specialized knowledge in the computation of hanger loads and the selection of the correct supports. Engineers in the field assist with problems in erection of pipe hangers.

**GRINNELL, ALONE, THROUGH ITS CONVENIENT WAREHOUSES CAN SUPPLY YOU "OUT OF STOCK"**

No manufacturer of pipe hangers offers a distribution system as thorough or efficient. Grinnell warehouses are located in 30 principal cities . . . with jobbers in practically every city, coast to coast.



**Grinnell makes scientifically designed, ruggedly built pipe hangers and supports for every type installation.**

Pipe suspension presents an extremely wide range of problems involving weights, stress, thermal movement, materials and specialized engineering. No one "goes into" the pipe hanger business overnight. Large manufacturing facilities, skilled technicians, and a lot of down-to-earth practical experience are needed.

Grinnell has become America's No. 1 supplier of pipe hangers and supports only because Grinnell has specialized in piping for one hundred years. Grinnell has developed a line of pipe hangers and supports for every piping requirement, from the simplest to the most complex.

Grinnell is always ready to co-operate with engineers and architects in the preparation of pipe suspension specifications.

Call Grinnell for any and all types of pipe hangers and supports.

# GRINNELL

**WHENEVER PIPING IS INVOLVED**

Grinnell Company, Inc., Providence, Rhode Island • Sales Offices and Warehouses in Principal Cities

pipe and tube fittings • welding fittings • engineered pipe hangers and supports
Thermolier unit heaters • valves • Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies • industrial supplies
Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

*When*
**PRODUCTION**
*hangs by a "Thread"*

specify the wire rope that gives the greatest service. "HERCULES" (Red-Strand) *Preformed* spools more evenly—bends more smoothly. Handles more safely. Splices more easily. Far fewer replacements are needed.

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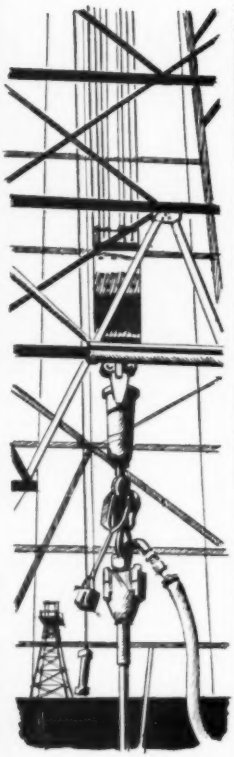

Feel free to consult our Engineering Department at any time for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis, Missouri. Warehouses and branch offices in all principal cities.

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**WIRE ROPE**


# *They Say—*

### Canadian Outlook

"Today western Canada has an actual potential of over 250,000 bbl. daily, this potential being the volume of oil that could be produced under sound conservation principles if the transport, refining, and marketing facilities were available.

"The potential is growing rapidly as discoveries continue and might well reach 400,000 bbl. daily—equal to self-sufficiency for all Canada—over the next 2 to 3 years. . . .

"At the start of 1947 western Canada's proved oil reserves were less than 100,000,000 bbl. Today the proved reserves are estimated at some 1,700,000,000 bbl.—a 1,700 per cent increase.

"Over the next 2 years at least $200,000,000 will be spent on transport and refining facilities—to provide by mid-1954 facilities and markets capable of supporting a year-round daily average production of some 280,000 bbl.

"If the great barrier of United States tariffs against Canadian oil can be lowered or eliminated, the 1954-55 market for our oil could be much larger than 280,000 bbl., and the market could expand greatly thereafter."

*Carl O. Nickle, member of Parliament for Calgary West, addressing the New York Society of Security Analysts.*

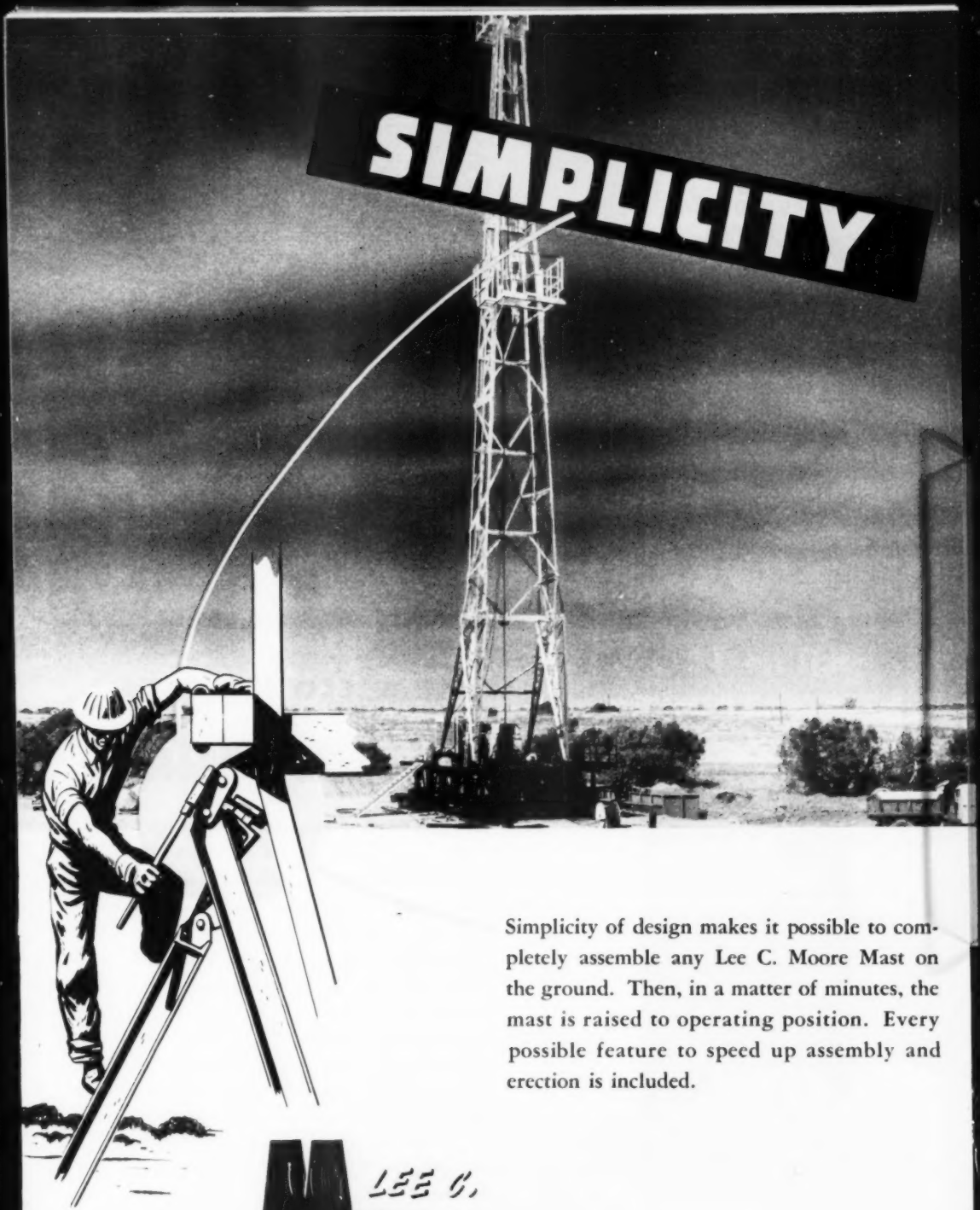
### New Fields for Oil

"The most interesting and one of the greatest potential markets for petrochemicals stems from the new developments in synthetic textiles. By 1960, production of these textile fibers is expected to reach one billion pounds which will be about 13 per cent of the total fiber production.

"It is now possible to completely clothe a man in oil. For example, he could wear nylon underwear, dynel socks, an orlon shirt, a dacron tie, a dacron or acrilan suit, and shoes from nylon with styrene soles. They are equally well adapted to many purposes other than clothing.

"The remarkable fact is that these fibers are not substitutes but actually superior materials to the natural fibers. The new fibers are resistant to heat, light, moths and mildew. They are more water repellent and therefore dry quickly and are more resistant to wrinkling than natural fibers. They do not shrink and have higher tensile strength than wool. The result is that they require little or no pressing, do not undergo deterioration as quickly as natural fibers, and give longer wear.

"At the same time, the price of




Simplicity of design makes it possible to completely assemble any Lee C. Moore Mast on the ground. Then, in a matter of minutes, the mast is raised to operating position. Every possible feature to speed up assembly and erection is included.

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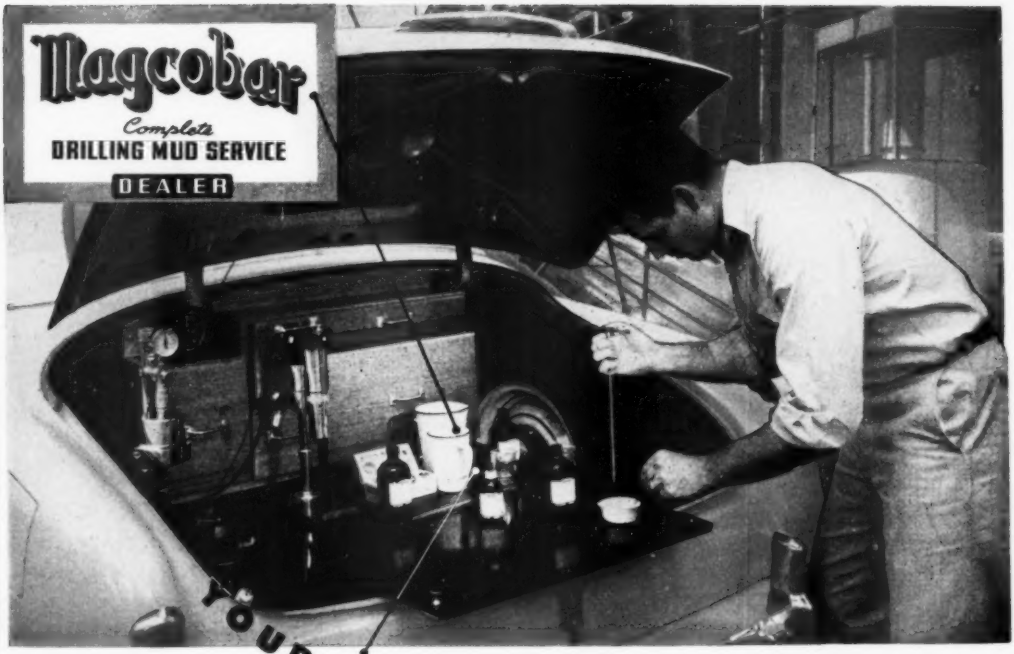

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So when you drill your first hole in a difficult area, contact Magcobar. The Magcobar field engineer, is familiar with the area and can give you benefit of first-hand experience in dealing with the problems to be encountered.

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synthetic fibers is advantageous. Acrilan is $1.85 per pound, dacron is $1.80, orlon $1.70 and dynel only $1.25. All of these prices are considerably lower than the present price range of wool. Further savings are effected by the lighter weight per square yard of the synthetics compared to wool."

*Dr. Gustav Egloff, Universal Oil Products Co., addressing the Oil Men's Club of Kansas City.*

### Integrated Industry

"Most distressing, insofar as the reputation of the oil industry is concerned, is the tendency in recent years for one group or another to go running to Washington with a tale of woe, not when they are hurt but when they think they may be hurt.

"If we value the prestige of our industry, and on our prestige depends our continued freedom from bureaucratic rule, let us keep our family quarrels within ourselves and do not let us wash our dirty linen in public squares or in government lobbies. Don't let us always be jealous of what the other follow gets, it always seems to be much more than it actually is. Don't let us shrug our shoulders and laugh at the misfortunes of another section of our industry as their misfortunes will ultimately be the misfortunes of all of us.

*H. S. M. Burns, president of Shell Oil Co., speaking before the New England district Oil Industry Information Committee.*

# CALENDAR

**February**

Wisconsin Petroleum Association, twenty-sixth annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 26-27.

American Association of Petroleum Geologists, Rocky Mountain Section, annual meeting, Salt Lake City, February 28-29.

Natural Gasoline Association of America, Permian-Basin regional meeting, Lincoln Hotel, Odessa, Tex., February 29.

**March**

Manufacturers Standardization Society of Valve and Fittings Industry, annual meeting, Hotel Commodore, New York City, March 3-5.

American Society for Testing Materials, spring meeting, Hotel Statler, Cleveland, March 3-7.

Pacific Coast Gas Association, annual technical services conference, Fresno, Calif., March 5-6.

American Petroleum Institute, Division of Production, southwestern district, Washington-Youree Hotel, Shreveport, March 5-7.

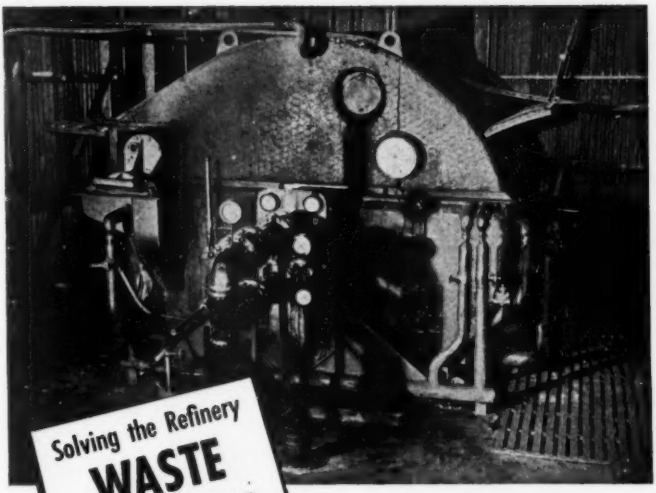
National Association of Corrosion Engineers, eighth annual conference and exhibition, Galvez Hotel, Galveston, Tex., March 10-14.

Illinois Petroleum Marketers Association, annual convention, Hotel Sherman, Chicago, March 11-13.

Texas Oil Jobbers Association, Inc., annual spring convention and refiners and suppliers exhibit, Hotel Adolphus, Dallas, March 12-13.

American Institute of Chemical Engineers, regional meeting, Atlanta, March 16-19.

Ohio Petroleum Marketers Association, annual convention and marketing exposi-

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WASTE DISPOSAL PROBLEM
. . . automatically, economically!

OLIVER PRECOAT FILTER

Trap residues—separator box emulsions—sludges . . . the Oliver Precoat Filter can effectively handle these wastes by dewatering sludges and breaking oil-water emulsions, resulting in stocks for refinery re-run and water ready for disposal in public streams. For example, a refinery is obtaining an oil phase carrying only 2/10 of 1% sludge and only a trace of water; the water phase is comparatively oil-free.

Oliver United engineers, calling on their 42 years of filtration experience and their many varieties of filter types, developed this closed type, continuous vacuum precoat filter for handling refinery wastes. It's proving a boon to refineries in connection with this vexing problem.

A letter or phone call to our nearest office will have a skilled refinery filtration engineer at your plant whenever desired to make a study and recommendations for a filtration plant to handle the wastes properly.

• • •

Another very profitable use of the Oliver Precoat Filter in refineries is in connection with contact clay handling. Many are in service providing continuous handling, great reduction in oil losses over other methods, and more easily handled cake.

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PIPE COUPLINGS AND FITTINGS

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tion, Deshler-Wallick Hotel, Columbus, Ohio, March 18-20.

**American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita, Kans., March 19-21.**

**American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Biltmore Hotel, Los Angeles, March 23-27.**

Texas Independent Producers and Royalty Owners Association, sixth annual meeting, Fort Worth, March 27-28.

North Texas Oil and Gas Association, twenty-second annual meeting, Kemp Hotel, Wichita Falls, Tex., March 29.

**Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 31-April 2.**

**Mid-West Gas Association, annual meeting, Hotel Radisson, Minneapolis, Minn., March 31-April 2.**

American Chemical Society, division of petroleum chemistry, annual meeting, Milwaukee, March 31-April 3.

**April**

Pacific Coast Gas Association, annual transmission conference, Berkeley, Calif., April 2-3.

**American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.**

Florida-Georgia Gas Association, annual convention, Soreno Hotel, Saint Petersburg, April 3-5.

Missouri Liquefied Petroleum Gas Association, Hotel President, Kansas City, Mo., April 7-9.

American Society of Lubrication Engineers, annual meeting, Statler Hotel, Cleveland, April 7-9.

Arizona Geological Society of America, forty-eighth annual meeting, University of Arizona campus, Tucson, Ariz., April 11-12.

Petroleum Industry Electrical Association and Petroleum Electrical Supply Association, twenty-fourth annual joint conference, Mayo Hotel, Tulsa, April 14-17.

**American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.**

National Petroleum Association, semiannual meeting, Hotel Cleveland, Cleveland, April 16-18.

**American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.**

American Petroleum Institute, safety and fire-protection committees, Hotel Texas, Fort Worth, April 21-24.

National Petroleum Council, conference rooms A and B of the Interior Department Auditorium, Washington, D. C., April 22.

**American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.**

Indiana Gas Association, annual meeting, French Lick Springs Hotel, French Lick, Ind., April 24-25.

Independent Petroleum Association of America, midyear meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 28-29.

American Oil Chemists' Society, spring meeting, Shamrock Hotel, Houston, April 28-30.

**American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y., April 30-May 2.**

**Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston, April 30-May 2.**

**May**

Southeastern Section Geological Society of America, and Southeastern Mineral Symposium, joint meeting, Hotel Roanoke, Roanoke, Va., May 1-3.

**American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 5-7.**

Interstate Oil Compact Commission, spring meeting, Phoenix, Ariz., May 9-10.

**American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.**

American Association of Petroleum Geol-

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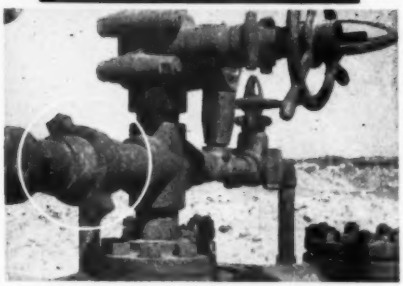

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The shorter, stronger sub ends of the WECO FIG. 602 UNION give it compactness plus the strength needed for today's deeper drilling. It is especially efficient for manifolding where clearances are limited and connections are close coupled.

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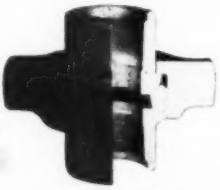
The Fig. 602 is another good example of why "It's Wise to Standardize with WECO." Start your standardization now, by specifying WECO Unions.

FIG. 602
6000 p.s.i. Test
Sizes: 1", 2", 3", 4"



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ogists, regional meeting, Mayo Hotel, Tulsa, May 12-13.

American Gas Association, Natural Gas Department, spring meeting, Biltmore Hotel, Los Angeles, May 13-13.

Annual Liquefied Petroleum Gas Association convention and trade show, Palmer House, Chicago, May 12-14.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 13-15.

Pennsylvania Gas Association, Wernersville, Pa., May 13-15.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute, division of marketing, midyear meeting, Copley Plaza, Boston, May 18-19.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, May 27-29.

Society of Exploration Geophysicists, Gulf Coast regional meeting, Rice Hotel, Houston, May 29-30.

Seventh annual short course in gas technology, sponsored by the Southern Gas Association, Texas College of Arts and Industries, Kingsville, Tex., May 29-31.

**June**

Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J., June 1-6.

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

Western Petroleum Refiners Association, regional technical and industrial-relations meeting, Broadview Hotel, Wichita, Kans., June 12-13.

International Gas Conference, Brussels, Belgium, June 16-22.

Kentucky Oil and Gas Association, annual meeting, Hotel Lafayette and Phoenix Hotel, Lexington, Ky., June 19-20.

Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco, June 22-25.

Michigan Gas Association, annual meeting, Grand Hotel, Mackinac Island, Mich., June 23-24.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Nicollet Hotel, Minneapolis, Minn., June 23-27.

**August**

Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco, August 11-13.

American Institute of Electrical Engineers, Pacific general meeting, Westward Ho Hotel, Phoenix, Ariz., August 19-22.

**September**

Pacific Coast Gas Association, Ambassador Hotel, Los Angeles, September 3-5.

**NOMADS**

**Tulsa Nomads**, third Friday of each month, After Five Room, Tulsa Hotel.

**Dallas-Fort Worth Nomads**, first Monday of each month, Greater Dallas Club.

**Houston Nomads**, second Monday of each month, Ye Olde College Inn, Houston.

**Los Angeles Nomads**, second Wednesday of each month, Jonathan Club.

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**Union connections between the gage and the valves permit removal of gage for repairs without shutting down the equipment. Just close the valves, uncouple the unions and remove the gage. The convenience of this is obvious. When glasses have to be replaced or repairs made, it is not necessary to work in an awkward position or to shut down. Another advantage: a gage needing repairs can be replaced immediately by a spare and the repairs made at leisure. There are many other reasons for the superiority of Penberthy Liquid Level Gages; ask for Catalog 35.**

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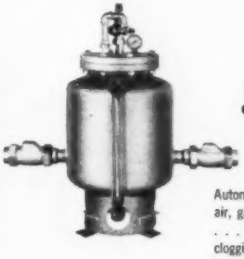

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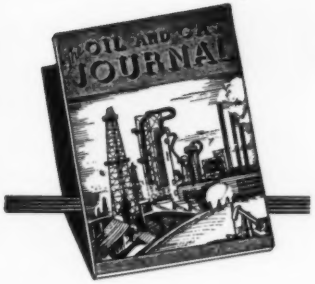


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# JOURNALLY Speaking

## Price of Progress

SADLY we note that the Royal Canadian Northwest Mounted Police is rapidly becoming a motorized outfit. It still has a few horses and sled dogs and perhaps a birch-bark canoe or two, but nowadays the Mounties get their men with the aid of petroleum-powered vehicles, airplanes, and launches. Our boyhood dreams will be completely shattered if we discover that they have abandoned their red coats too.

The oil industry has a lot to answer for in its mad rush for progress. With cattle now being herded by jeep and shipped by truck, and with sheriffs, bandits, and Indians all riding the highways in automobiles, the romance of the Old West is gone. And now the Mounties. Move over, Junior, we want to watch that horse opera on television with you.

## Pictures of Us

WE'RE now on film—our favorite oil publication, we mean. The old volumes of all of our Fifty Golden Years have been recorded for posterity on microfilm and the rolls of film are carefully stored away in a fireproof bank vault.

We had these films made when we discovered that our single set of bound volumes is the only complete file of The Oil and Gas Journal (which started life in 1902 as The Oil Investors Journal) in existence, and if anything should happen to this set it would be a terrible disaster for future oil historians. We discovered this when a number of oil companies tried to write their own histories and combed the country in vain for old oil publications which might provide reference material. One company sent a researcher all the way from New York to study our old volumes, and he found data which he had not been able to locate anywhere else.

Now if you want to check up on anything that happened in the oil industry in the past half century we can make you a print of some of our microfilms. But if you want a film of anything we have printed during the last 4 years you can get it from a commercial outfit, University Microfilms, in Ann Arbor, Mich., which is in the business of microfilming important publications—which naturally includes the Big Yellow Book.

## These Women!

A WOMAN'S-PAGE editor, writing about the new synthetic fabrics for men's suits which can be made from petrochemicals, ends her column by asking the petroleum industry to send her a man with the same specifications as his suit: resisting weather and wrinkles, light, handsome, and easy to handle. Any volunteers?

These women are never satisfied. The petroleum industry already has performed wonders for both men and women in lightening their daily tasks and improving their living. Now if the industry should succeed in making men easy to handle, life would be robbed of its chief interest for a majority of the so-called weaker sex.

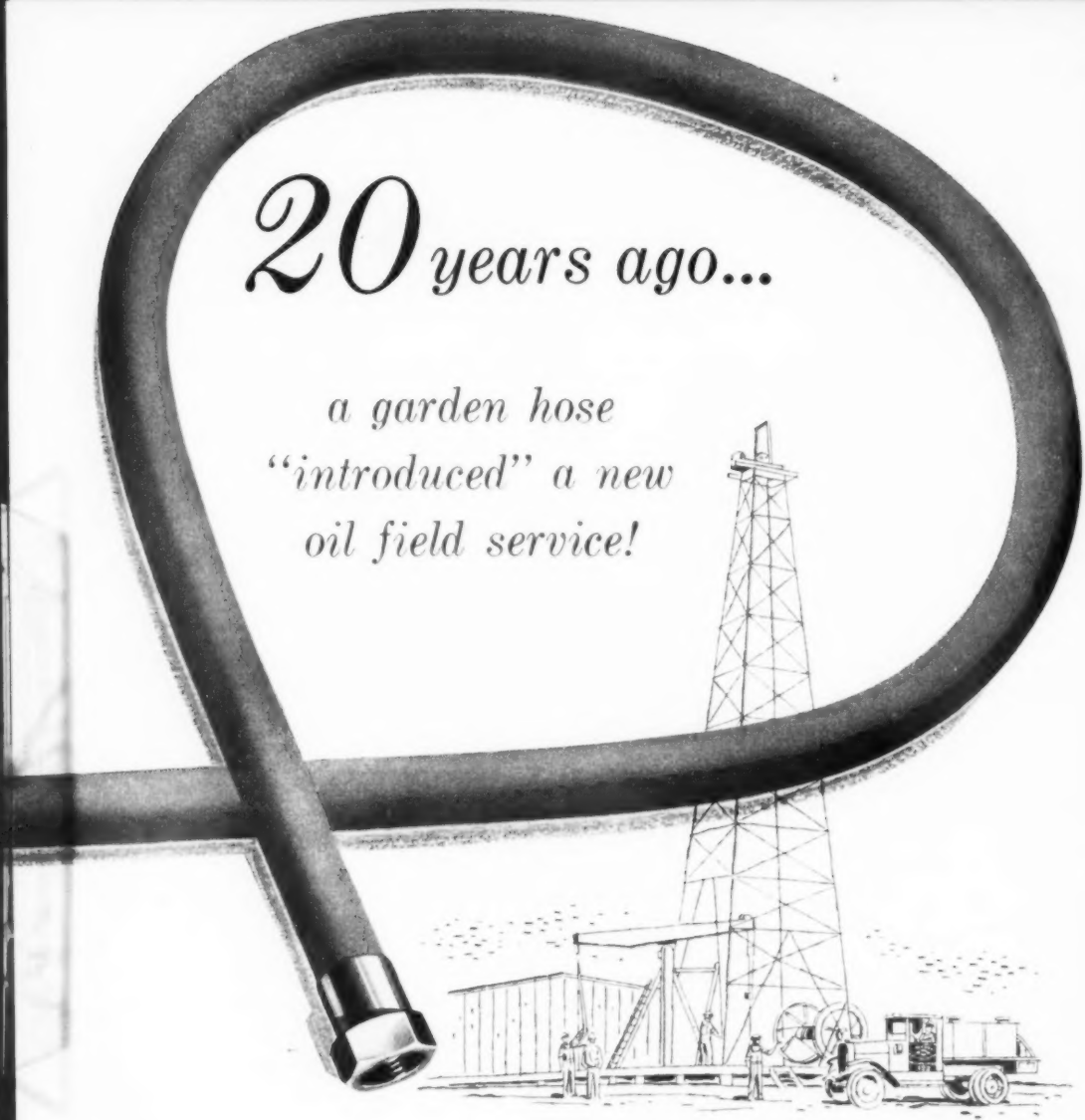
## Where's Mendoza?

ONE of our South American subscribers writes in to suggest that we correct his address stencil to read Mendoza, Argentina, instead of Mendoza, Arizona. He says he's been getting the magazine all right, but he thinks we ought to keep our geography straight, just for the record. Funny thing is that the Post Office Department toted the magazine clear across the world and delivered it to the right town without ever complaining to us about the slight error in address. We take back all the nasty thoughts we thought about the POD on account of some of our Christmas cards not being delivered until after Christmas.

## "66" Rockets

PHILLIPS PETROLEUM CO. has announced that it is going into the manufacture of fuel for rockets. That's really a forward-looking step, putting the company in the van of progress and staking a claim to the interplanetary travel market. Looks like Phillips thinks the automobile isn't here to stay.

—*Henry D. Ralph*




It was just an ordinary forty-foot piece of garden hose. Yet, this was the first piece of equipment used by The Dow Chemical Company to introduce inhibited acid into an oil well in central Michigan. The date, February 11, 1932, marked the *beginning of acidizing service* to the oil industry.

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FOR OIL INDUSTRY CHEMICAL SERVICE

the OIL AND GAS JOURNAL

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# duplex

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***GUIDING, FLOATING AND CEMENTING EQUIPMENT***

**DUPLEX**

# It takes more than steel to drill 100,000 wells

DRILLING 80,000 wells in 18 months is a mighty big program, but that's what the Petroleum Administration for Defense says the oil industry can and should do.

PAD will attempt to get the steel for this much drilling beginning the second half of this year. This will be a much larger quantity of oil-country tubular goods than has ever been available in any similar period.

The new PAD program, assuming that the steel is available, will mean that the industry will drill more than 100,000 wells during the two calendar years 1952 and 1953. The size of this program can be realized by comparing it with the 44,500 wells drilled in 1951, the biggest drilling year on record.

THIS is not a war program. Admittedly it would not provide enough oil to fight a major war without rationing civilian users. But it should provide a backlog of proven reserves and excess producing capacity to take care of any emergency demands short of war.

Strictly speaking, this is not a PAD program. It was not framed in an ivory tower on the basis of what some theorist thought would be proper. Practical oil men serving with PAD established the goal after surveying the industry's capabilities. They believe the industry can drill this many wells if it gets the materials and will drill them if it has the incentives of continued demand for oil and continued profit from its production.

The demand for petroleum products has been increasing rapidly for several years and current conditions in this country indicate that it will continue to increase steadily for some years to come. Since it takes several years for drilling, particularly exploratory drilling, to be translated into established capacity to deliver refined products, the drilling program proposed for the next 2 years does not appear to be excessive.

WHETHER or not the oil industry can achieve this drilling goal depends on many things besides the allocation of steel tonnage for oil-country tubular goods.

New drilling rigs must be built, new crews hired and trained, auxiliary equipment and supplies obtained. And to make the new oil available to users there must be new pipe lines and new refining capacity. The 100,000 wells are just the beginning; if they are drilled it will mean tremendous expansion of every branch of the industry.

All this will require an enormous amount of new capital. There is little doubt that the capital will be secured if—if the outlook for the price of oil and for retention of a fair share of earnings after taxes give promise of a reasonable return on the investment.

This question, fully as much as the allocation of steel, will determine whether or not the 100,000 wells will be drilled.

# THIS WEEK

**COMING THROUGH.—It isn't often that a crew raises a pipe line to let a train pass, but this photograph proves it does happen. The odd development came about as Midwestern Constructors, Inc., was preparing to lay a Mississippi River crossing for Texas Illinois Natural Gas Pipe Line Co. Temporary launching tracks crossed the track of the Illinois Central Railroad, and the pipe being readied for launching occasionally had to be lifted by boom tractors and dragline to permit I.C.R. freight trains to pass.**

**REFINING**—Reactions of petroleum products and petrochemicals under extremely high pressures to be explored by Atlantic Refining Co. in first laboratory of its kind in industry. . . . Initial operations involve pressures up to 100,000 psi. . . . Company to study high-pressure nitration, amination, hydrogenation. . . . ¶Refiners will get more TEL beginning March 1. . . . PAD grants 7 per cent increase after year of reduced consumption in view of more plentiful supplies of metallic lead, other materials. . . .

**INTERNATIONAL**—Declining production in United States, Saudi Arabia, and Kuwait in December is reflected in 126,000-bbl. daily drop in world crude output from November's daily production of 12,007,400 bbl. . . . Interruption in steady upward trend, however, is regarded as being only temporary. . . . ¶Long stalemate in Iranian oil nationalization issue is broken as Iran and World Bank reach partial agreement on settlement. . . . Talks will continue. . . . ¶New 50-50 participation agreement in Iraq finally is formally approved over heated opposition from extremist and nationalist groups. . . .

**LABOR**—March 3 set as date for nation-wide refinery walkout. . . . Strike for 25-cent hourly wage boost and increased differentials for night work aimed at shutting down operations on Gulf Coast and in Great Lakes area, which together account for more than half of the nation's petroleum products. . . . West Coast apparently not to be included in current strike plans.

**PRICES**—OPS sets ceilings for Navy special fuel oil. . . . Runs into storm of protest over $2.10 top on sales at Gulf Coast ports. . . . Gulf ceiling is lower than ceiling prices of both Bunker C and No. 2 heating oil, which are blended to make Navy special. . . .

**PRODUCTION**—New technique determines where water is entering a pumping well by measuring electrical resistivity of fluid in well bore. . . . Developed by Halliburton, the "Strataflow" process involves displacing fluid in well bore with fresh water and recording changes in resistivity caused by incoming salt water. . . . ¶Texas Railroad Commission increases state's March crude-production allowable by 39,429 bbl. per day over February's by permitting 24 producing days throughout most of the state. . . .

**PIPE LINES**—Midwestern Constructors official tells companies they can save time and money if they show contractors just how they want the job done. . . . Good management in straight construction operations pays off in profit—gambling on uncertainties of a job often doesn't. . . . ¶Contracts for the big "Rancho" pipe line from West Texas to Houston are expected to be let this week. . . . Construction of the 455-mile, 24-in. line is scheduled to get under way in April. . . . Cost of the project estimated at $41,600,000. . . .

**STEEL**—House subcommittee kicks off investigation of charges by small and independent producers that they aren't getting their share of the steel. . . . ¶PAD opens way for wildcatters to get required tubular goods by authorizing swaps with supply houses, other operators.

**ACTIVITY**—Production of crude and lease condensate averaged 6,349,025 bbl. daily for week ended February 16, down 21,100 bbl. daily. . . . ¶Well completions for the week totaled 831 compared with 917 for previous week and 603 for same week in 1951. . . . ¶Wildcat completions decreased 9 wells to 186. . . . ¶Rotary rigs operating in United States on February 18 amounted to 2,703, up 23 rigs for the week. . . .

**TRENDS**—The decrease of 1,822,000 bbl. in major product stocks in District 3 for week ended February 16 indicates a big jump in shipments to the East Coast. . . ¶Major product inventories in District 2 on February 16 were 16,249,000 bbl. greater than last year. . . . The 12-month gain for all districts was only 17,062,000 bbl. . . .

# Strike Ordered

**Union policy leaders set March 3 as date for threatened nation-wide walkout aimed at slashing refinery throughput**

A NATION-WIDE strike by 22 cooperating oil unions which threatens to cripple this country's refinery operations has been set for March 3.

The strike would be centered in the Gulf Coast, where refineries are now running about 2,100,000 bbl. per day, and the Great Lakes area, which is turning out about 1,300,000 bbl. daily.

Together, these two major refining areas represent more than half the current output of petroleum products throughout the nation.

Date for the strike was set February 20 at a meeting of representatives of the 22 unions in Denver. Union spokesmen claimed as many as 275,000 workers belonging to AFL, CIO, and independent unions would respond to the strike call.

Labor's principal demand is for an across-the-board wage increase of 25 cents an hour. The unions also are asking an increase in shift differentials, raising the night shift from 4 to 6 cents per hour extra and the graveyard shift from 6 to 12 cents.

**Strike effects.**—Opinions varied widely on the ultimate results of the strike threat.

Many refiners on the East Coast were doubtful that a major, widespread strike would actually occur. If it should, they said, they questioned whether it would last long enough to seriously affect the product-supply situation.

Union representatives, on the other hand, said the entire industry "will be paralyzed if necessary." O. A. Knight, president of the CIO Oil Workers International Union, said 300 of the union's 600 bargaining units have voted "overwhelmingly" to strike.

**Gulf Coast.**—Refinery workers in the area around Houston, Port Arthur, Beaumont, and Texas City have voted overwhelmingly in favor of a walkout.

All major refineries are expected to be shut down except the 315,000-bbl. refinery of Humble Oil & Refining Co. at Baytown, Tex. Here no vote has been taken because the union, the independent Baytown Employes Federation, has a contract which does not expire until December. The union's president, however, said the union would support the combined drive of other unions by not accepting anything less than the 25-cent hourly increase sought in the nation-wide campaign.

Only other refinery in the area expected to be unaffected by the strike is the 37,500-bbl. refinery of Eastern States Petroleum Co., Inc., at Houston.

**East Coast.** — Drawn-out negotiations between Sinclair Oil Corp. and labor representatives halted again last week in New York. Sinclair is the only oil company organized on a national basis and its negotiations have been followed closely by the industry.

The stalemate was reached after the company stood pat on a reported wage-increase offer of about 10 cents an hour which the union refused to accept.

A break in the cooperating unions' united front developed at the 165,000-bbl. refinery of Esso Standard Oil Co. at Bayonne, N. J. Here the independent union, formerly included in the CIO group demanding a 25-cent increase, accepted a company offer of a 4.6 per cent wage boost.

Esso now has contracts in effect with independent unions at its Bayway, N. J., Charleston, S. C., and Everett, Mass., refineries providing for a 3.4 per cent wage increase.

The strike at Tide Water Associated Oil Co.'s 77,000-bbl. Bayonne, N. J., refinery this week was past its fiftieth day and there were no indications of settlement. Here the independent union was not asking for a wage increase but for a closed shop, changes in seniority provisions, and other items.

**West Coast.**—California operations apparently were being ignored in plans for the nation-wide strike.

In Long Beach, Charles Armin, district director of the Oil Workers International Union, which is spearheading the drive for higher wages in other parts of the country, said last week that no local in the State of California had yet taken a strike vote.

He added, however, that votes would be taken "if the situation demands one."

# Synthetic Gas

**It can be made—at a price—and may be needed soon to supplement natural gas, but much research is needed**

**George Weber**

NEW YORK. — What will we do when natural gas runs out? This question was raised at a symposium on gasification and liquefaction conducted by the coal division of the American Institute of Mining and Metallurgical Engineers during the annual meeting of the institute here last week.

The solution offered by two speakers from the oil and gas industry was: Make a synthetic gas from coal suitable for pipe-line transportation. They reported on experiments which indicate that this can be done—but there are many obstacles yet to be overcome before it is commercially feasible.

To the parade of papers outlining various techniques and opinions as to future possibilities, two petroleum-industry spokesmen added some interesting views and revealed some new work. Some agreement exists that eventually it will be necessary to augment deliveries of natural gas in the northern markets by the development of a more-or-less comparable synthetic gas made from coal.

**The need.**—It may be later than we think, said C. R. Breck of Southern Natural Gas Co. The demand for additional domestic and commercial pipe-line gas in at least one section of the North (the extreme Northeast) will probably be felt rather keenly before an adequate synthetic-gas project, developed on economic lines, could be completed, even if initiated in the near future, he said.

The evidence, he continued, is considerable that such a project would be technically sound and economically self-supporting, although the margin of profit at first might be so small and the magnitude of an economic enterprise so great that private financing would be impossible without government aid in some form or other.

Breck did not discount the possibility that extensive new gas reserves might be discovered and that pipe-line construction into marketing areas will be greatly augmented. However, he aired the opinion that it would certainly seem unlikely that the deficiency indicated will ever be wholly supplied by natural gas. It would probably be 5 years or more after the go-ahead signal before all the "bugs" could be eliminated from an economic-size synthetic pipe-line gas plant and before full commercial operation could be established. Demand for natural gas accelerates so

rapidly in areas only partially supplied that at least a considerable part of the deficiency anticipated can be expected to be heard from within a very few years.

**The cost.**—This line of thought led Southern Natural to a program of investigation back in 1944, including experimental and cost-estimating work, to answer two questions: (1) is it technically practicable to make pipe-line gas from coal? and (2) if so, what would it cost? Assumed was a theoretical plant using the German Lurgi process for making synthesis gas from bituminous coal and converting it with a nickel catalyst to methane. This 250 M.M.c.f. per day plant located at Pittsburgh would produce gas at 1,200 psi.

The answers came in reverse order. A "realistic" cost of pipe-line gas at 90 per cent load factor was estimated at 58 cents per M.c.f. Once a permanent deficiency in normal gas supply is recognized, this price at Pittsburgh would certainly not be prohibitive, concluded Breck.

**Texaco process.**—Dubois Eastman reported on commercial and research projects bearing on the subject, in which The Texas Co. has a hand. In practical terms, the most promising materials to date for synthesis gas conversion are natural gas (methane), residual oils (refinery "bottoms"), and coal (all grades from sub-lignites to anthracite), said he. Inventions resulting from Texaco research in all three catagories have advanced the day of competitive synthesis products, he continued.

Successful research has shown that refinery residual oils can be "upgraded" by conversion to synthesis gas, Eastman reported, but he offered no elaboration on this statement.

Concerning coal conversion to synthesis gas, he presented a preliminary report on his company's progress. Two factors limit present commercial methods. The coal used is confined to noncaking type and the pressure in the vessel where the reaction takes place is kept close to atmospheric. Since synthesis gas is further reacted under high pressure, costly intermediate compression is required.

**Progress and promise.**—"Research and development work being carried out by The Texas Co. on the foregoing and related problems has proceeded to the point where it is now possible to announce that the two major deterrents to continuous high-pressure gasification of coal have been eliminated," he stated. By The Texas Co. process, any type of coal may now be converted under high pressure into synthesis gas.

Raw coal, ground in a wet mill, is mixed with water in a slurry varying from 40 to 60 per cent coal by weight. Pumped through a heater, this suspension of pulverized coal and steam enters the reaction chamber at several hundred pounds per square inch and at temperatures which may exceed 1,000° F. Heated oxygen is fed into the reactor through a separate inlet. Product gas ($H_2$ and CO) is withdrawn through a waste-heat boiler, and molten ash is allowed to flow from the bottom of the reactor.

Fuels ranging from lignite to anthracite have been used as feed in the Texaco pilot plant at Montebello, Calif. Gasification of coal has been as high as 95 per cent. Oxygen-consumption rates ultimately expected are 15 to 20 M.c.f. per ton of dry coal with 80 to 90 per cent of the heating value of the coal appearing in the form of hydrogen and carbon monoxide in the synthesis gas.

**Obstacles remain.**—The way is now open, said Eastman, to send high-octane gasoline, diesel fuels, and other synthetic hydrocarbon products direct to market from the mine face, thus eliminating cross-country rail transport of bulk coal. Open, but not yet economically feasible. The general public should not be led to believe that pilot-plant studies assure unlimited supplies of synthetic high-octane gasoline in the immediate future. Translation to commercial-sized plant will involve staggering engineering problems.

"Briefly, the possibilities are unlimited—but so are the obstacles," summarized Eastman.

# Sound Industry

## Oil's chief characteristic is its self-reliant way of reinvesting its earnings, borrowing little, A.I.M.E. told

NEW YORK.—The oil industry's financing methods mark it as a sound and an exceptionally self-reliant segment of the nation's business.

The industry's outstanding characteristic is the extent to which it reinvests its earnings, Frederick G. Coqueron and Joseph E. Pogue, of the petroleum department of Chase National Bank, said in a paper presented here last week before the American Institute of Mining and Metallurgical Engineers.

"Only about one-sixth of the total capital employed by the petroleum industry is in the form of borrowings, a low ratio which is conducive to economic stability," the authors said.

The industry, they added, "has been singularly self-contained in the process of capital formation and therefore ranks as an exceptionally self-reliant enterprise making minimum call upon outside savings for cash."

Conclusions of Pogue and Coqueron were based on a 17-year study of 30 major oil companies comprising about two-thirds of the petroleum industry. The study covered the period 1934 through 1950.

**Inflation's effects.**—Income of the oil companies has been overstated during the past 5 years, the authors said.

Inflation has boosted tremendously the cost of replacing the industry's assets, but these assets are being amortized on the basis of their original cost.

"In effect what has happened," the authors said, "is that the petroleum industry has been selling its low-cost productive assets, particularly crude-oil reserves, and has been taking the profit into operating income and paying taxes on it, without proper provision for replacement at current inflated costs."

The net effect is, they said, that the industry has been paying income taxes on its capital investment.

**Risk capital.**—The oil industry has not depended upon risk capital to a great extent for its growth, Pogue and Coqueron reported.

For its money needs above its own earnings it has leaned primarily toward borrowing rather than sale of stock. This has been encouraged in recent years, they said, by artificially low interest rates.

At the same time, risk capital has been drying up as a result of stock-exchange regulation, limits on use of credit in purchase of securities, and the high taxes on personal incomes. As a result, they said, it would appear that one of the principal reservoirs of funds is not fully available and that the industry must resort more on higher product prices and borrowings to create its needed capital for expansion.

"If this example is typical," they said, "it should follow that an effective means of offsetting high prices in general would be a reduction in the income taxes levied against savers."

**Integration.**—Another outstanding characteristic of the oil industry, the authors agreed, is its integrated structure.

"The functions of exploration, production, transportation, refining, and distribution are linked together in a continuous interrelated series of activities.

"All along the line, from producing areas to final consumers, specialized methods and facilities have been developed to solve the technical and economic problems in the continuous flow of a liquid commodity from innumerable sources of supply to countless points of consumption.

"Integration is inherent in this in-

dustry and contributes to its efficiency and economy," they said.

They pointed out that, in terms of capital investment, the petroleum industry is fourth largest in the nation, exceeded only by agriculture, railroads, and combined public utilities.

Its gross investment in property, plant, and equipment at the end of 1950 they estimated at 25 billion dollars. Gross assets were estimated at 32.9 billion.

# Contractors' View

## Pipe-line companies told they can save money by being more specific; contractors prefer not to gamble on jobs

**Paul Reed**

TULSA.—Pipe-line contractors can work more effectively and economically if the companies for which they are working show them clearly what is expected in a construction job.

In presenting the contractor's view of owners and their employes, Clark C. Bledsoe, secretary-treasurer of Midwestern Constructors, Inc., said closer understanding of pipe-line company requirements can be obtained by adequate instruction of company inspectors and by preliminary discussions between the contractor's foremen and the inspectors on how the job should be handled.

Bledsoe's paper was presented by Clyde Wyant, vice president and general superintendent of Midwestern, before a meeting of the Pipe Liners Club of Tulsa and the Tulsa chapter of the National Association of Corrosion Engineers.

**Contracts.**—Some companies which are vague in indicating what they want should give more definite detail in their specifications, the speaker said. Pipe-line companies are rated by contractors—a fact which should be given wider recognition—and contractors' preferences are reflected in their bids.

In the long run, he said, contractors make their profit in good management of straight construction operations and not in gambling on the uncertainties of the jobs. Consequently, he added, it is advantageous for both owners and contractors to minimize the gamble element in bidding.

To this end, he said, contracts should include rock clauses and provisions for paying for welding on a per-weld basis. Specific arrangements are desirable, also, covering repair of washouts and other damage on the right-of-way behind cleanup operations, providing for either work by the pipe-line company crews or by the contractor on a cost-plus basis.

Bogie-type contracts designed to share the risk between owners and contractors often are not advantageous to contractors on the usual type of job. The bonus-penalty features of such contracts, he said, only benefit the contractor on extremely hazardous work such as river crossings.

**Bids.**—In preparing bids, he said, successful contractors take four steps:

1. Estimate bare cost of the job. New contractors often stop here and deceive themselves by failing to take the next three steps.
2. Determine cost between limits indicated by previous jobs. Experienced contractors give these limits serious consideration.
3. Figure in the amount of money the contractor must make to warrant undertaking the job.
4. Provide for gambling against bad weather and other uncertainties.

Extremely low bids which overlook any of these four steps, he said, may prove expensive.

Selection of bidders is important, he added, because a pipe-line company should relieve itself of responsibility for the construction operations. Equipment, personnel, and know-how should be taken as the basis for determining a contractor's ability.

## Morrow Buying Bonanza

DENVER.—Tevis F. Morrow, Los Angeles independent operator, is buying Bonanza Oil Co. from Dr. Victor Ziegler and others for $18,598,560, Morrow announced here last week.

Bonanza has 10 flowing wells in Bonanza field near Worland, Wyo., capable of producing between 25,000 and 30,000 bbl. daily. The discovery well, 1 Victor Ziegler, was completed in December of 1950.

Ziegler, former head of the geology department of Colorado School of Mines, is the founder and president of Bonanza. Sale of the company to a Texas group was the subject of negotiations several months ago but was never consummated.

## Price Committee Named

A price advisory committee has been appointed by Charlton H. Lyons, president of the Independent Petroleum Association of America, "to strengthen the position of the oil industry in its efforts to obtain an increase in crude-oil prices."

George H. Bruce, president of Aladdin Petroleum Co., Wichita, Kans., was named chairman, and Lyons has asked 25 leaders of the petroleum industry representing all producing areas to serve on the committee.

The new committee is expected to advise I.P.A.A. officers on policies and procedures to be followed in seeking an increase in present price ceilings. The association already has a cost-study subcommittee of its economics committee which for some months has been gathering statistics and supporting data for use in seeking a price increase.

Appointment of the new committee came a few days after Russell B. Brown, general counsel of the I.P.A.A., wrote Lyons that there appears to be little hope of obtaining higher ceilings on petroleum under present laws and regulations.

"The administrative organization of the Office of Price Stabilization," Brown declared, "has evidenced no appreciation of the requirements of the petroleum industry nor of the necessity of providing a program under which that office could make such necessary increases.

"Therefore, it would seem advisable for the Congress to provide for the removal of the ceiling on crude petroleum."

# Water in Wells

## New method locates its entry point in pumpers

NEW YORK.—A new technique which locates levels of water entry into pumping wells was described to the petroleum branch of the American Institute of Mining and Metallurgical Engineers last week.

Wilfred Tapper of Halliburton Oil Well Cementing Co. described the new method, called the Strataflow process. Its general principle involves displacement of fluid in the well bore with fresh water throughout the zone to be tested.

As the well continues to produce, formation liquid entering the well bore dilutes the conditioning fluid. Incoming salt water makes a marked difference in electrical resistivity at its point of entry, which difference is measured by running a resistivity electrode through the annulus of the section under test.

Successive records can be made at frequent intervals to enable the operator to study the resistivity pattern as it develops. Since the pump inlet is near the bottom of the hole, the movement of all water in the fluid column is downward. The high-resistance conditioning water, in passing formations producing salt water, has its resistance lowered.

As the well production stabilizes, the downward flow of the column of fresh water and the flow of formation water into the column both approach stable values. The change in resistivity across any producing horizon therefore reaches a value dependent upon the rate of formation production. In contrast, the fluid resistivity in the liquid column re-

mains unchanged through sections of the bore hole where no salt-water production occurs. This resistivity pattern is characteristic of the water productivity of the well formations.

Although fresh water has been used to date as the conditioning fluid, Tapper and his coauthor, Ralph E. Hartline of Stanolind Oil & Gas Co., noted that any fluid with measurable physical, chemical, nuclear, or electrical property could be used so long as such property is distinctive from that of the formation fluid, and provided that conditioning fluid is miscible with that in the well bore. To date only pumping wells have been tested, since the electrode is run through an open annulus.

Accuracy of the resistivity-pattern interpretation was substantiated in a test well by cementing the well to the casing seat and then progressively redrilling through the producing horizon with periodic production tests made by swabbing. Initial water appeared in quantity at the first level of entry indicated by the survey, and lower points of entry as shown in the survey yielded additional volumes of salt water.

## New Lube Classifications

DETROIT.—By letter ballot, members of the American Petroleum Institute general division of marketing have given unanimous approval to new recommended service classifications for lubricating oils. Acceptance of the new classifications will not be completely official, however, until approved by the A.P.I. executive board of directors, which is expected to act on the matter within the next month or two.

The new service designation defines operating conditions under which lubes must perform in spark ignition and diesel engines and thereby provides oil manufacturers added freedom in compounding oils to meet specified service conditions.

The new system is widely approved by refiners for this particular reason. *(The Oil and Gas Journal, November 8, 1951, page 167.)*

## Industry Briefs

**WILMINGTON. — Stockholders of** Oil Exploration Co. will vote here this week on a proposed merger of the company with Wichita River Oil Corp. Merger already has been approved by holders of 90 per cent of the stock of Wichita River. Oil Exploration, formed in 1931, owns a majority of Wichita River stock.

**LOS ANGELES.—Union Oil Co. has** sold its entire fleet of 619 tank cars to General American Transportation Corp. Union will lease sufficient tank-car equipment from the transportation concern to handle distribution of its petroleum products.

# EASTERN

## Heating-Oil Relief

### PAD sets rules to avert shortage on East Coast

WASHINGTON.—Procedures under which East Coast resellers of heating oils will procure additional supplies to avert any threatened shortage have been set out by the Petroleum Administration for Defense in PAD Instruction No. 1.

The regulation covers the distribution of the additional heating oil which will be brought into the area under the voluntary agreement subscribed to by 12 supplying companies for delivery to resellers designated by PAD.

An application for supplies will be filed by the reseller on Form PAD-65. If the application is approved, PAD will issue a delivery-order authorization by which the required heating oil, including kerosine, may be obtained.

**Cancellation clause.** — Authorizations will specify the company or companies from which the reseller may obtain supplies, and he will be given 5 days in which to enter into a sales contract for purchase of the oil at established ceiling prices and under the seller's usual terms of sale or payment. If a contract is not made within the 5-day period, the PAD delivery order will be automatically canceled.

PAD pointed out that Instruction No. 1 will operate independently of the voluntary agreement under which additional supplies will be made available. It will be effective until May 1.

In the instruction, PAD explained that "because of certain economic dislocations which have prevented, at present price ceilings, the production, acquisition and transportation of additional quantities of heating oil needed in the East Coast area, extraordinary steps have been necessary to assure an additional supply of heating oil and to forestall an imminent shortage. A voluntary agreement has been agreed to in principle by certain East Coast supply companies, pursuant to which additional supplies of heating oil will be made available to the East Coast. This instruction has been issued to assure that this heating oil will be distributed in such manner as to alleviate to the maximum extent any shortage conditions which may exist."

The voluntary agreement was approved by Defense Production Administrator Manly Fleischmann last week. An East Coast supply committee was appointed by Interior Department Secretary Oscar L. Chapman to handle the details involved in distributing the additional oil that is to be supplied.

**Participants.**—The 12 companies which will participate in the agreement and the maximum quotas of oil which they will supply are:

Atlantic Refining Co., 210,000 bbl.; Cities Service Co., 190,000; Esso Standard Oil Co., 945,000; Gulf Oil Corp., 470,000; Hess, Inc., 60,000; Pan American Petroleum & Transport Co., 100,000; Shell Oil Co., 155,000; Sinclair Refining Co., 205,000; Socony-Vacuum Oil Co., Inc., 340,000; Sun Oil Co., 125,000; The California Co., 60,000; and The Texas Co., 70,000; a total of 2,930,000 bbl.

# MID-CONTINENT

## New Beaver County Strike

BEAVER, Okla.—Beaver County, focal point of an intensive leasing and exploratory play in the wide-open Oklahoma Panhandle following discovery of the county's first oil production less than 2 months ago, is virtually assured of another oil field.

Carter Oil Co.'s and Emby Kaye's rank wildcat 1 Sid Sharp, located 2 miles north of Floris in the C SE SE 31-6n-22eCM, in the northwestern part of the county, came in late Wednesday following a 3,000-gal. acid treatment. The well flowed 128 bbl. of clean oil in the first 3 hours through open tubing, and Thursday was continuing to flow to lease tanks.

Production is from a lime zone in the Pennsylvanian Cherokee section, opposite which casing is perforated at 5,833-49 ft. Total depth, where casing is bottomed, is 5,867 ft.

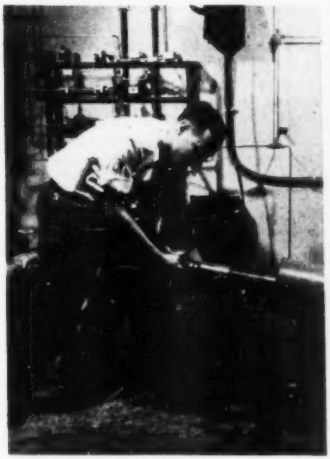
Location is 12 miles northwest of the county's first oil producer, Flynn Oil Co. 1 School Land, 2 miles north of Beaver in SE SE SE 35-5n-23eCM, which opened the South Forgan field. It is 4 miles southeast of the gas-distillate producing Light Ranch field, the county's only other production.

## Interstate Name Dropped

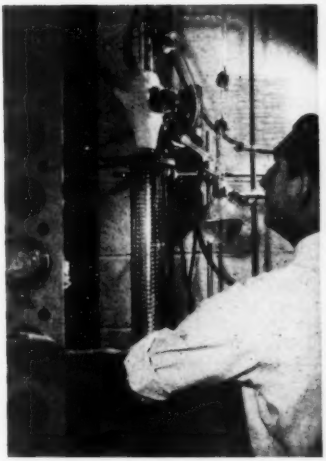
TULSA.—Interstate Petroleum Co., a holding company, has been absorbed by White Eagle Oil Co., which owns all stock of Helmerich & Payne, drilling - contracting and producing company.

Interstate's only assets were 91 per cent of the White Eagle stock. W. H. Helmerich, president of all three companies, remains president of White Eagle and Helmerich & Payne following the reorganization.

The merger followed sale of the interest in Interstate and White Eagle of William Broadhurst *(The Oil and Gas Journal, February 18, page 97).*



**AGITATION.—Sample being loaded into rocking autoclave for subjection to extremely high pressures.**



**EVALUATION. — End products are evaluated in this fractionation unit. Control unit is visible at left.**

**STIRRING.—A 1-gal. stirring centrifuge is lowered into place before beginning another experiment.**

# High-Pressure Research

## Experiments to determine product reactions under extreme pressures of 100,000 psi. possible in new Atlantic lab

George Weber

PHILADELPHIA.—A new extreme-high-pressure laboratory, the first of its kind in the petroleum industry, has been placed in use by Atlantic Refining Co.

Investigations of reactions involving petroleum fractions and petroleum-derived chemicals at pressures up to 100,000 psi. are possible in the new lab, an addition to the company's refinery laboratories adjacent to the Philadelphia refinery.

Since much of this research will lead into unexplored fields and will concern unpredictable reactions, extensive safety precautions have been taken by the company's research and development department, which designed the lab, to protect personnel and equipment.

With no precedent to follow in design of some equipment, the designers have incorporated ample safety factors to allow for possible unforeseen mishaps.

**Studies planned.** — For the present, work in the lab will consist of experiments involving relatively small quantities of material.

In general, Atlantic plans to investigate such fields as high-pressure nitration, amination, and hydrogenation. Much of the work will concern the synthesis of petrochemicals, in which the company has taken a prominent position.

**Lab design.**—Initially the laboratory is equipped with a five-stage compressor capable of delivering 100,000 psi. All pressure vessels are fabricated from stainless steel.

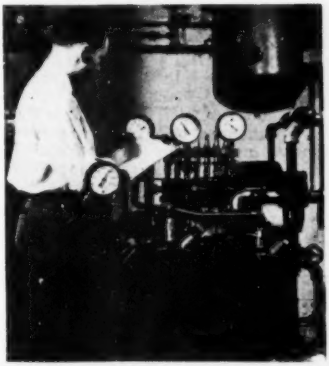
High-compression equipment includes autoclaves, reactors, and centrifuges. These are installed in four separate test cells located in line across one end of the laboratory building.

Each cell is constructed with three heavily reinforced concrete walls separating it from other cells and from the control room. These barriers are capable of preventing penetration by fragments driven at a pressure of 250,000 psi.

The rear walls of the cells, which constitute the end wall of the building, are of light wood construction. They face a heavy buttressed-concrete barricade outside the building. In case of an equipment failure in any remote-controlled cell, the explosive force would be directed harmlessly through the light wall, outward, and upward.

Cells are entered from the control room through thick, steel-jacketed doors.

Twin panels in the laboratory control room permit operators to conduct their high-pressure experiments by remote control and observe conditions in the cells without entering them. A fifth reinforced cell is provided for storage of gases and liquids under pressure.



**COMPRESSION. — Five-stage compressor producing 100,000 psi. is carefully checked during build-up.**

**PROTECTION. — Concrete barricade outside thin rear wall designed to deflect explosive forces away from workers.**

# Steel Study

## House subcommittee to check complaints from independent producers that they're not getting their share of steel

**Bertram F. Linz**

WASHINGTON. — Complaints from small and independent oil producers that they are not faring well under the system set up by the Petroleum Administration for Defense for the allocation of oil-country tubular goods will be aired this week before a House small business subcommittee.

The subcommittee, headed by Rep. Clarence G. Burton of Virginia, will open hearings February 27 at which officials of the Defense Production Administration and PAD will be questioned regarding both the adequacy of the over-all steel allocation for the oil industry and the method by which supplies are distributed.

The committee staff has been digging into the oil-steel situation since last year and has secured considerable data and figures regarding allocations, drilling programs, and inventories of both large and small operators from PAD.

The subcommittee is going into the oil situation as part of its comprehensive investigation of problems of small business under the Controlled Materials Plan.

"The investigation will include three general areas," Burton explained in scheduling the hearings.

"First, we shall attempt to determine whether the oil-producing industry is receiving an over-all allocation of steel adequate to develop the additional oil reserve and the daily oil production needed for the defense program and for essential civilian supply.

"Second, we shall investigate the question of whether the steel allocated to the PAD by the DPA is being fairly distributed to the various classes of operators.

"Third, we shall attempt to determine whether steel allocated to each class of operators is being fairly distributed to the individual producers in each class."

Following the appearance of DPA and PAD officials the subcommittee is expected to hear from individual operators who feel they have been discriminated against in the allocation of tubular goods.

Members of Burton's subcommittee include Reps. Joe L. Evans of Tennessee, Clinton D. McKinnon of California, R. Walter Riehlman of New York, and Horace Seely-Brown, Jr., of Connecticut.

**Metal exports.** — Elsewhere on the metals front, the Office of International Trade reports that less steel, tinplate, and wire-mill products will be available for export for foreign petroleum operations during the second quarter than was allocated for the current quarter.

There will be more brass-mill and foundry products and aluminum available for export, however.

Export quotas set up by OIT reduce the allotment of carbon steel from 150,000 tons for this quarter to 146,000 tons; alloy steel from 12,000 to 9,500 tons; stainless steel from 1,400,000 to 1,100,000 lb.; tinplate from 16,000 to 14,500 tons, and wire-mill products from 1,373,000 to 1,150,000 lb. Exports will be increased, however, in the case of brass-mill products from 750,000 to 836,000 lb., foundry products from 14,000 to 58,000 lb., and aluminum from 66,000 to 77,000 lb.

DPA has published its allocations of controlled materials for second-quarter domestic operations, allotting PAD 1,709,500 tons of steel, 8,275,000 lb. of copper and copper-base alloys, and 1,240,000 lb. of aluminum.

# Wildcat Safeguard

## PAD to permit widespread trading of tubular goods

WASHINGTON. — In another move to prevent interruptions in the supply of tubular goods for wildcatters, the Petroleum Administration for Defense has given operators and supply houses wide latitude for "trades."

The first step in this effort was taken the first of this month, when emergency stocks of supply houses were shifted to provide increased availability in areas of greatest activity.

Under a system just set up by Deputy Administrator Bruce K. Brown, if an operator finds that his nearest emergency field stock does not have the sizes, grades, or weights of casing or tubing he requires, he will have one of three courses open to him:

... **A supply company** fairly close to wildcat location will probably have, or be about to get, pipe that would meet requirements, and the operator may place his order with that company which in turn will be able to get an equal tonnage of some other grade or size from the emergency stock.

... **Another operator** in the neighborhood of the wildcat location may have a supply of the required pipe, but he in turn may need a size or grade that is plentiful in the emergency stock. This operator may give the needed pipe to the wildcatter and accept in exchange an equal tonnage of the size or grade he wants from the emergency stock.

... **The custodian** of the emergency stock may order the required size and grade from the mill if: (a) Delivery can be made in time for the wildcat operation, (b) the pipe ordered is a popular type, and (c) its delivery will not exceed the monthly tonnage limits of the field stocks.

Wide latitude also is given to custodians of the emergency field stocks in getting tubular goods, Brown said. A custodian may, for instance, hold both emergency stocks and M6A stocks received in the field for regularly scheduled drilling by operators who normally drill eight or fewer wells a year. He may trade between the two inventories at will so long as he exchanges equal tonnage in each transaction.

He may also trade on an equal tonnage basis a string of pipe he has in long supply for a string of needed pipe that some operator has in surplus. In no case will the size or grade of pipe affect the trade.

Deliveries of pipe from emergency field stocks may be made only on H-2-E tickets issued by PAD. But deliveries may be made from M6A stocks on any authorized ticket, including the H-2-E, it was explained.

**Distribution.** — PAD also made two changes in the procedure for distributing oil-country tubular goods, effective the second quarter:

Set-aside fields stocks are to be reserved for operators who normally drill 8 weeks or fewer a year or who got an allotment of 50 tons or less for the quarter. Previously, these stocks were reserved for operators who normally drilled fewer than 11 wells in a year.

Provision will be made for allotments for operators who filed too late for primary allocations, if any tubular goods are available after both primary and supplementary allocations have been made to operators who filed in time.

## Tanker Deals to Be Studied

WASHINGTON.—The entire field of tanker purchases from the U. S. Maritime Commission may be investigated by a congressional committee, Sen. Clyde R. Hoey of North Carolina, chairman of the Senate permanent investigating committee, hinted here last week.

Hearings have been resumed in the probe of operations of a group set up in 1947 by former Rep. Joseph E. Casey of Massachusetts, operating as American Overseas Tanker Corp.,

which allegedly netted $3,250,000 on a $101,000 investment of eight surplus tankers.

## More TEL Freed

### Refiners get 7 per cent increase as stocks rise

WASHINGTON.—An increase of 7 per cent in the permissible use of tetraethyl lead fluid, effective March 1, has been granted refiners by the Petroleum Administration for Defense in a revision and extension for 1 year of PAD Order No. 1.

The order was issued a year ago to conserve supplies so that a stockpile of TEL could be built up. Currently, the two manufacturers have about filled their available storage space. PAD has no authority to require refiners to stockpile, and no government agencies at interest, particularly the military, have given support to proposals for stockpiling by the Government at its own expense.

The original order restricted refiners who had used more than 1,000,000 lb. of TEL during 1950 to a base allotment of that amount plus 80 per cent of their 1950 consumption in excess of that base. Those who had used 1,000,000 lb. or less during 1950 were allowed their full 1950 consumption. During the past year readjustments were made to provide "hardship grants" to refiners who had been shut down during part of 1950, whose gasoline production had to be abnormally increased, or whose base-period use, for other reasons, did not fairly reflect their need for the fluid.

In computing the permitted 7 per cent increases, the 1951 allocations plus the hardship grants will be considered as a base. It will not, however, include special grants made for extraordinary demands that are not expected to occur again, such as grants to some refiners for the manufacture of military aviation gasoline.

**Reasons for relaxation.**—Relaxation of the order was possible, officials explained, because supplies of metallic lead and other raw materials used in the manufacture of the fluid have recently become more plentiful and the TEL manufacturers have been able to boost their output.

It was disclosed that Interior Secretary Oscar L. Chapman recently wrote to Secretary of Defense Robert A. Lovett inviting his views as to the suitable size of the lead stockpile and whether the military would be willing to support an expanded stockpiling program.

Beyond that, it was said, PAD has gone as far as possible in the absence of official support for its program.

The extended PAD order continues the provisions for hardship grants virtually unchanged. The provisions for reporting are completely unchanged, but a new section has been added providing that no one may be held liable for damages or penalties arising from compliance with the order.

### Oil on Williston's Rim

**Another discovery in the Montana portion of Williston Basin has been indicated by 1 East Poplar Unit of C. H. Murphy et al. Operators of this winterized rig obtained 4,150 ft. and 3,200 ft. of 38°-gravity oil on two drill-stem tests in the Mississippian-Charles limestone at about 5,660 ft. This wildcat on the flat, snow-covered prairie is 30 miles north of Shell Oil Co.'s 1 Northern Pacific in the Richey area, first well to find oil in the Montana segment of the Williston Basin. The frigid rig above is now drilling ahead below 9,000 ft. In spite of temperatures as low as —37°, no time has been lost due to bad weather. Mud tanks and mud and water storage are inside the building.**

## Small Refiners Get Break

WASHINGTON.—The small refiner is faring better than his larger competitors under the accelerated tax-amortization program, the Petroleum Administration for Defense reports.

Analysis of certificates of necessity for new refining facilities recommended by PAD, representing about 1,000,000 bbl. daily of additional capacity, shows that when construction is completed the crude capacity of the 156 refiners who process less than 20,000 bbl. of crude daily will have increased from 9.8 to 10.8 per cent of the total domestic refinery capacity and catalytic cracking will rise from 1.8 to 5.8 per cent, according to Deputy Administrator Bruce K. Brown.

Brown said that when the facilities recommended by PAD are completed this group will have made a 29 per cent increase in crude-running capacity and almost a four-fold increase in catalytic cracking capacity.

On the other hand, the 19 companies with the largest refineries, 50,000 bbl. a day or more, will have a 15 per cent increase in topping capacity and 41 per cent in catalytic cracking.

The intermediate group of 20 companies with refinery capacities between 20,000 and 50,000 bbl. daily will have made a 24 per cent gain in crude-running capacity and 53 per cent in catalytic cracking.

## Fuel-Oil Ceilings

### OPS terms Navy special prices "generally fair"

WASHINGTON.—The Office of Price Stabilization has set up a schedule of ceilings for Navy special fuel oil which it contends is "generally fair and equitable." It admits, however, that the price of $2.10 per bbl. for cargo sales at points on the Gulf Coast is lower than bids recently received from major refiners.

The OPS schedule provides for prices of $2.20 per bbl. in the San Francisco Bay area, $2.15 in California south of San Francisco, $2.10 on the Gulf Coast, and $2.70 at New York, Philadelphia, and Baltimore.

The controversy over Navy special prices dates back to last year when the Petroleum Administration for Defense issued a directive to several companies to furnish the Navy's needs. A provision was that the price should be mutually agreed to by the Armed Services Petroleum Purchasing Agency, the suppliers, and OPS. An agreement was reached, but only with respect to those particular needs.

During the lengthy negotiations over the fixing of prices for later deliveries, PAD suggested that either the ceilings be entirely eliminated or a price of $2.17 be established on the Gulf. The need for this action, preferably for ceiling elimination, was based on the fact that Navy special is a blend of bunker fuel and lighter oils which could be sold separately at higher prices.

**"Alternate use" rejected.**—In this connection, OPS said that pricing of Navy special on the basis of alternate-use values would require establishment of a ceiling high enough to permit suppliers to recover the full value secured if they sold the components as Bunker C fuel and No. 2 heating oil in commercial markets.

"While it is true of the oil industry that the alternate-use value of both finished and unfinished products plays a large part in determining

market prices for some products in normal times, during the present emergency, when price control is necessary, general application of the alternate-use principle would destroy practical price control," OPS declared.

"To permit full recovery of alternate value is tantamount to forcing the U. S. Government to bid up the price of an essential commodity in short supply—the very thing that the Defense Production Act is designed to prevent."

## Product Exports Down

WASHINGTON.—Exports of major petroleum products during the week ended January 25 averaged 198,800 bbl. daily, a drop of 23,000 bbl. from the preceding week, according to preliminary figures compiled by the Petroleum Administration for Defense.

Average daily exports of distillate and residual fuel oils increased during the week, but those of the other products (aviation and motor gasoline and kerosine) declined, PAD said.

Exports in thousands of barrels daily of the individual products for the week ended January 25, compared with the preceding week and the average for 4 weeks ended January 25 were as follows:

| | Jan. 25 | Jan. 18 | 4 Weeks ended Jan. 25 |
|---|---|---|---|
| Aviation gasoline | 29.2 | 63.3 | 31.2 |
| Motor gasoline | 40.1 | 3.2 | 31.6 |
| Kerosine | 14.6 | 64.8 | 26.0 |
| Distillate | 74.6 | 64.2 | 63.9 |
| Residual | 40.3 | 31.3 | 58.4 |
| Total | 198.8 | 226.8 | 211.1 |

## Controls Orders Amended

WASHINGTON.—The following orders have been issued by the defense agencies:

Petroleum Administration for Defense:

**Amendment and extension of PAD Order No. 1,** February 14: Regulating the use of automotive tetraethyl lead fluid by refiners, effective March 1.

**Instruction No. 1,** February 18: Providing the procedure whereby heating-oil resellers on the East Coast may obtain additional supplies.

Office of Price Stabilization:

**Supplementary Regulation 5 to CPR 17,** February 15: Setting specific ceiling prices for Navy special fuel oil.

National Production Authority:

**Amendment to M-86,** February 14: Bringing the regulation on copper-wire mill-products distribution into fuller conformity with the Controlled Materials Plan.

**Amendment to M-82,** February 14: Bringing the regulation on brass-mill-products distribution into complete harmony with the Controlled Materials Plan.

**M-98,** February 14: Directing the flow of used tin cans regularly collected in California and Arizona to shredding plants for use in the production of copper.

# WATCHING WASHINGTON

**Bertram F. Lins**

## Getting in the Scrap

The Petroleum Administration for Defense has added up the figures and finds the oil and gas industry is making a very substantial contribution to the scrap drive.

A mere handful of companies, responding to the Government's appeal to collect all available iron and steel scrap so that the steel mills could keep running, turned in over 160,000 tons of metal last year, with promises of even more in 1952.

The industry is so widespread that it is difficult to get complete statistics on collections, but the reports which have reached Washington indicate that oil and gas men are fully conscious of the bitter scrap cycle—no scrap, no steel, and no steel, no oil.

Big contributors to the 1951 scrap pile were Sun Oil Co., which pioneered the drive in the industry at the request of the Iron and Steel Institute and collected 8,000 tons during the last 6 months of 1951; five California associations whose members turned in 38,000 tons; Sinclair Refining Co., 7,626 tons found after a 1950 drive that developed 50,000 tons; Esso Standard Oil Co., 15,315 tons; Standard Oil Co. of California, 14,000 tons; Standard Oil Co. (Ind.), 8,000 tons; Atlantic Refining Co., 4,465 tons; Pan American Refining Corp., 1,494 tons; Ohio Oil Co., 2,700 tons; and Richfield Oil Corp., 914 tons. The American Gas Association places the collections in that branch at 61,000 tons.

## No Opinions So Far

The Federal Trade Commission so far does not appear to have worked out any recommendations to accompany a report it plans to submit to Congress in the near future on the intercompany arrangements of American and foreign oil companies engaged in production activities throughout the world.

The report so far is a purely factual historical review of prewar cartel arrangements and postwar relationships, the latter between the American companies themselves as well as between them and foreign companies with which they are associated.

To some extent the report is expected to support recent charges that a small group of companies exercise effective control over the world's petroleum, but it is questionable whether the commission will maintain the charge that this control is being used to prevent so-called "independents" from getting a foothold in the foreign field in view of the fact that independent groups already are operating in Kuwait and Mexico and are being invited to go into Venezuela.

However, the commission is expected to draw a picture of American companies working hand in hand with foreign companies throughout the world to fix prices, allocate markets, etc.

Failing the submission of specific recommendations for legislative or other action, the report is not seen as making much of a stir in Congress this year, in view of the political situation, unless it is transmitted before the foreign-aid appropriation is acted upon. This would afford time for the airing of allegations that the companies sold oil for Marshall-plan funds at unduly high prices at the expense of the American taxpayer who footed the bill for economic cooperation.

## Crude Decontrol Sought

Domestic producers seeking higher prices are planning to ask the Office of Price Stabilization to decontrol crude oil.

Failing acceptance of the idea by OPS they will carry their plea to Congress, where hearings will open next month on extension of the Defense Production Act which provides the authority for price and materials control.

The producers will argue that there is no need for ceilings on crude prices because there is no competitive bidding for the product at the consumer level, which is where the dangers of inflation occur. They will point out that they are selling oil today at 1947 prices, that even when prices generally were skyrocketing between the time of the Korean outbreak and the imposition of the "freeze" order in January, 1951, crude prices resisted all pressures.

A major contention will be that were it not for price control the threatened shortage of heating oils on the East Coast this winter would have been averted by price revisions. Past experience has shown that an increase in prices to cover increased costs would have brought out the needed oil.

# Expansion Problems

## Gulf Coast refiners find materials shortages prolong new projects, look for future crude-supply difficulties

**F. Lawrence Resen**

HOUSTON. — Materials shortages and prospects of an increasingly tight crude supply are worrying refiners along the Gulf Coast.

Notwithstanding the enormous amount of money already committed to the building program in this area, refinery expansion is limping along as shortage materials hinder smooth planning and construction progress.

As one refiner puts it, "Programs which should have been completed in 12 months and were started shortly after Korea stretched out to 18 months. Start a similar project now, and you'd better count on 24 months—if you're lucky."

**Not much help.**—Do orders help? Not much. Take this typical situation faced by a Gulf Coast refiner and repeated in substance by many others: "We've had orders in with manufacturers for 8 months for several vessels. Now we find that the manufacturers haven't been able to get the steel." Another said, "Take copper, alone. It's a vital material in several of our processes, but we've just learned that some copper we requested, which wasn't going to be available until the third quarter of this year, now has been pushed back until the first quarter of 1953."

Refining expansion is nation wide, and materials procurement promises to be a touch-and-go proposition for many months. An increase in refining capacity of 150,000 bbl. per day this year to 7,360,000 bbl. per day and further expansion to 7,650,000 bbl. daily by 1954 is predicted. *(The Oil and Gas Journal, January 28, 1952, page 237.)* Mobilization Director Charles E. Wilson is seeking expansion to 8,000,000 bbl. daily by 1955.

Aside from their expansion and enlargement needs, refiners along the gulf will require materials to build new facilities to handle sour West Texas crude which will begin moving into the area soon through new pipe lines. Many refineries, concerned in the past only with handling sweet East Texas and Gulf Coast crudes, have not had to build sweetening and desalting facilities.

There have been occasional bright spots on the construction horizon, but they promise to diminish in the future. One plant has been experiencing considerable success in the first stages of its expansion, but the superintendent says, "We have been more fortunate than some of the neighboring plants, and although we have maintained our schedule to date, we are anticipating shortages and difficulties with deliveries in the immediate future."

**Crude supply.**—Refiners are acutely conscious of the crude-supply situation which promises to become increasingly tight as more facilities go on stream. Considerable jockeying now is taking place among purchasers in lining up future crude commitments. Also, refiners once completely dependent upon purchased crude are attempting to build up their own reserves as a cushion against critical market conditions.

However, production isn't increased instantaneously, and the refiners in this high-production region are close enough to be aware of the operator's difficulties. "We know that you can't increase a refinery's capacity overnight," said a major refinery superintendent, "and we likewise know that it takes time and adequate tubular goods to develop new reserves and increase production.

"It won't do the refining industry any good to expand its facilities by 1,000,000 bbl. and then have them partially idle waiting for production to catch up. Allocation of steel on an industry-wide basis—and a nation-wide basis—should be made as much as possible to have expansion in all segments of the industry maintaining the same pace."

**Higher allowables.** — Refiners think the crude situation could be improved if state regulatory bodies would increase production allowables somewhat, while still maintaining sound conservation practices. The Texas Railroad Commission, for instance, has been conscious of the national and international situation in the past years, as witnessed by their boosting allowables during World War II and when Iranian oil was first removed from the world market.

"Of course," said an independent refiner, "there is no assurance that the commission would increase allowables as a matter of course just to meet increased refining capacities. However, much of the argument against increasing allowables during the past several months has hinged on the large amount of stocks currently in aboveground storage. Once increased demands begin whittling at these stocks, chances are that the commission would be inclined to view the allowable increase more favorably."

### Rancho Contracts to Be Let

HOUSTON.—Contracts for construction of the "Rancho" pipe line from West Texas to Houston are expected to be let this week.

H. H. Anderson, vice president of Shell Pipe Line Corp., said construction on the 455-mile, 24-in. line is expected to begin in April. The line will cost about $41,600,000 and will provide much-needed additional pipeline capacity between West Texas producing areas and the Gulf Coast.

Shell Pipe Line was named to design and build the line, which is owned in part also by Tide Water Pipe Line Co., Nantucket Pipe Line Co., Ashland Pipe Line Corp., Sinclair Pipe Line Co., Pan American Co., and Phillips Pipe Line Co.

### Baxterville Price Raised

HOUSTON.—Gulf Refining Co. has increased to $1.40 per barrel the price it pays for heavy crude from Mississippi's Baxterville field. The new price posting followed action by the Office of Price Stabilization in raising the ceiling from $1.15 to $1.70.

Gulf, Superior Oil Co., and Humble Oil and Refining Co. are the major producers in the field, and Gulf is the principal purchaser. Crude is moved through Gulf's new $6,000,000 line connecting Baxterville and the higher-gravity Eucutta and Heidelberg fields with a terminal at Mobile, Ala.

## Washington Briefs

**Cornelius W. Dwyer, formerly deputy** chief of the petroleum division of Economic Cooperation Administration and more recently in charge of a long-range petroleum study for the President's Materials Policy Commission, has been appointed chief of petroleum and petroleum-equipment branch of Mutual Security Agency, successor to ECA.

**William A. Keeler, Bartlesville,** Okla., vice president of Phillips Petroleum Co., will take over March 1 as director of the refining division of the Petroleum Administration for Defense, succeeding C. E. Davis who will become assistant deputy administrator in charge of domestic petroleum operations, relieving Alfred P. Frame who will return to his position in the Cities Service organization. John H. Lacy, Auburn, Ala., consultant on manpower and labor relations problems, has been named director of the PAD manpower division, succeeding Samuel E. Hill who has resigned to become a public member of the construction industry stabilization commission in the Wage Stabilization Board.

# Resid Getting Short

**Stock withdrawals at present rate for another 6 weeks would cause shortage in area, but industry is optimistic**

D. H. Stormont

LOS ANGELES.—California's residual-fuel-oil stocks have been dropping steadily for 2½ years and have now reached a level comparable to the low point established toward the end of the last world war.

Present inventories, placed by the American Petroleum Institute at 10,479,000 bbl., are not yet considered critical. However, continued withdrawals at the current rate of about 60,000 bbl. daily for as much as 6 weeks longer probably would create an over-all shortage in the five West Coast states.

This condition is not expected to materialize, though, because the period of heaviest consumption has about reached an end.

The current tight situation is a complete reversal from that which prevailed late in 1949. Then West Coast stocks totaled 40,440,000 bbl., and were climbing at a monthly rate of about 2,000,000 bbl.

To reduce available supplies, individual companies started shutting in wells which produced heavy crudes. By April 1950 there were 3,437 such wells shut in, removing from the market some 62,000 bbl. per day of low-gravity crude.

**Distress shipments.**—To reduce inventories distress shipments were made to the East Coast. This action resulted in fuel-oil stocks being reduced by 21,848,000 bbl., dropping to 14,238,000 bbl. before such shipments ceased in the fall of 1950. By the first of last year total California stocks had climbed to 17,107,000 bbl. but since then they have steadily declined.

This stock decline has been registered despite all shut-in low-gravity wells being restored to production and resumption of development in heavy-crude fields. An outstanding example of the latter is San Ardo field, now producing almost 20,000 bbl. daily as compared to less than 5,000 bbl. a year ago.

**Contributing factors.**—Factors which contributed most to this decline have been increased power plants, military, and vessel-refueling demands. Railroads, until last year the leading user of California fuel oils, dropped to third place in importance.

The Bureau of Mines' 11-month demand figures indicate demand averaged about 340,000 bbl. daily during last year. Of this total, power plants took 55,900 bbl. daily, about 14,000 bbl. more than in 1950. Military demand for the year averaged 49,100 bbl. daily, up 10,000 bbl.; and vessel refueling increased almost 9,000 bbl. to 68,300 bbl. daily. Railroad demand continued to drop, averaging 49,400 bbl. or about 10,000 bbl. less daily than in 1950.

**Bunker bargain.**—Much of the increased bunkering activity, which currently is believed to be running well above last year's average, is being attributed to the bargain prices at which bunker fuel can be purchased in West Coast ports.

For example, current quotations at Balboa, C. Z., are $2.60 per barrel; at Beaumont and Houston, $1.85; and at Tampico, $1.95. At Los Angeles the spot-market price is $1.70. Thus, when possible, vessels are taking on fuel at Los Angeles, or San Francisco where the price is $1.75 per barrel.

## Gas Injection Approved

LONG BEACH.—Plans for a small-scale gas-injection program in an upper Terminal fault-block pool have been approved by the Long Beach Harbor Commission.

The pilot-plant operation will involve injecting about 6,000 M.c.f. daily into this pool for several months. If the operation proves feasible the commission then plans to install a $1,500,000 plant capable of injecting 20,000 M.c.f. daily.

Purpose of the injection program will be two-fold: It will repressure the oil zone and increase ultimate oil recovery, and will store gas for future use in the city-owned gas system.

# SOUTHWEST

## Texas Raises Allowables

AUSTIN.—Allowable production of crude oil in Texas during March has been set by the Texas Railroad Commission at 3,131,665 bbl. per day, an increase of 39,429 bbl. per day over the allowables as of February 16.

The increase was accomplished chiefly by permitting 24 producing days throughout most of the state during the 31-day month, 2 days more than in February. East Texas field is given 19 producing days.

The allowed 3,131,665 bbl. per day compares with the Bureau of Mines estimate of March demand for Texas crude of 2,850,000 bbl. per day, and with purchasers' nominations totaling 3,111,144 bbl. per day.

The accompanying table shows the allowable by districts for March compared with latest weekly allowable.

| | Allowable as of Feb. 16 | Allowable for March | Change from Feb. 16 |
|---|---|---|---|
| Dist. 1 | 37,155 | 37,400 | + 245 |
| Dist. 2 | 170,390 | 173,620 | +3,230 |
| Dist. 3 | 514,765 | 521,999 | +7,234 |
| Dist. 4 | 278,079 | 282,475 | +4,396 |
| Dist. 5 | 65,638 | 66,444 | + 806 |
| Dist. 6 (outside E. Tex. field) | 129,867 | 131,285 | +1,418 |
| Dist. 6 (E. Tex. field) | 272,273 | 269,043 | −3,230 |
| Dist. 7-B | 104,673 | 106,003 | +1,330 |
| Dist. 7-C | 135,616 | 137,801 | +2,185 |
| Dist. 8 | 1,084,784 | 1,104,454 | +19,670 |
| Dist. 9 | 200,784 | 202,925 | +2,141 |
| Dist. 10 | 98,212 | 98,216 | + 4 |
| Total | 3,092,236 | 3,131,665 | +39,429 |

## Salt Creek Unit Sought

AUSTIN.—General Crude Oil Co., Dallas, has asked the Texas Railroad Commission to approve a unitization agreement for Salt Creek field of Kent County, West Texas.

The proposed plan would (1) increase ultimate recovery of oil by injecting produced gas back into the producing formation; and (2) conserve for further utilization gas and liquid hydrocarbons now flared.

Martin G. Miller, Houston, consultant for General Crude, said the agreement obligates the operator of the unit to construct an extraction plant. Cost of the unitization program was estimated at $685,000.

Evidence indicates, he said, that 97 per cent of the operating interests and 71 per cent of the royalty owners in the field have signed the agreement. The participating factor, Miller said, is based 50 per cent on productive surface acreage and 50 per cent on gross acre-feet of reef.

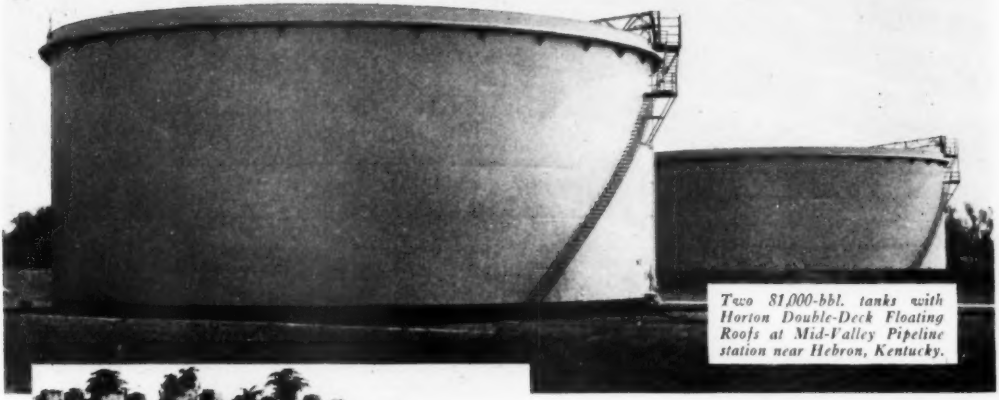
The 4,400-ft. contour is used in determining productive surface acres.

## Penntex Interests Sold

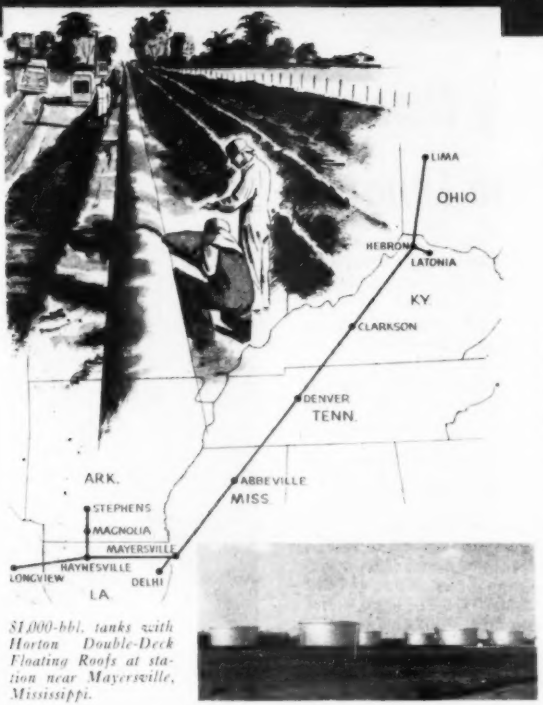
SNYDER, Tex.—Tide Water Associated Oil Co. has purchased the interests of the former Penntex Oil Corp. in four leases in Scurry County, Texas. The leases are in Kelly-Snyder field. Penntex interests involved a net production of about 270 bbl. per day.

Penntex stock was sold in January to Robert K. Gilbert and Charles M. Hart, Los Angeles, for $2,250,000. Hart and Gilbert are now liquidating much of the company's holdings. Penntex, with headquarters in Los Nietos, Calif., operated properties in Texas, California, and Wyoming.

# Crude Oil Takes a Shortcut to Ohio



*Two 81,000-bbl. tanks with Horton Double-Deck Floating Roofs at Mid-Valley Pipeline station near Hebron, Kentucky.*




*81,000-bbl. tanks with Horton Double-Deck Floating Roofs at station near Mayersville, Mississippi.*

## MID-VALLEY PIPELINE reflects new refinements in Engineering and Construction Methods

Mid-Valley Pipeline Company's system — stretching 1000 miles from Texas to Ohio — is one of the nation's newest underground crude oil bearing arteries. It was designed to increase the future petroleum supplies for consumers of oil products in Ohio and adjoining states, and to attain the optimum economy of operation with the lowest capital investment.

To assist in this program, Horton Double-Deck Floating Roof tanks have been installed at pumping stations and terminals to provide maximum efficiency and economy in the handling and storage of the crude transported. These modern roofs reduce evaporation losses, cut down the fire hazard and reduce corrosion on the inside of the tanks. All Horton Roofs rest directly on stored liquids and eliminate the space where vapor might collect.

Bulletin B contains further details.

# CHICAGO BRIDGE & IRON COMPANY

*Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA*

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025—201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 C & I Life Bldg.
Los Angeles, 17....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3...1615—1700 Walnut Street Bldg.
San Francisco, 4.....1554—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.
Washington 6, D. C.....1139 Cafritz Bldg.

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Constructions Metalliques de Provence, Arles-sur-Rhone, France
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Comprimo N.V., Amsterdam—O, Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
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# Shorten Laying Time With Long Pipe Lengths

More and more oil and gas men are finding that the long lengths of Armco Welded Steel Pipe (up to 50 feet) help them get the job done faster and at less cost.

It means fewer sections to haul and handle so stringing moves fast. Assembly costs are slashed because there are fewer field joints.

But this is only one of the money-saving plus values of Armco Pipe. You match job requirements exactly to save metal and money. Diameters range from 6 to 36 inches and wall thicknesses from 9 64- to 1/2-inch.

What's more, Armco Pipe has uniform weldability and ample ductility for field laying by all standard methods to protect you against costly delays.

You will find Armco Welded Steel Pipe efficient and economical for pipe lines and gathering systems as well as plant piping. Write for complete data. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 1432 Curtis Street, Middletown, Ohio, 201 KOME Building, Tulsa, Oklahoma. Subsidiary of Armco Steel Corporation.

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**Armco Welded Steel Pipe**

ARMCO

# Drilling Challenge

## PAD's plans for 80,000 wells in 18 months would mean 101,000 holes in 1952-53; rigs would be a big problem

**John C. Casper**

IF the petroleum industry gets enough steel to drill the 80,000 wells set as a goal by the Petroleum Administration for Defense for the 18-month period ending December 31, 1953, total drilling for the 2 full years of 1952-53 will reach about 101,000 wells.

The prospect of drilling more than 100,000 wells in 24 months presents a serious challenge to the oil industry and raises some interesting questions. How many of these wells will be wildcats, how many rigs will be required, what increase in proven reserves can be expected, and how much will the nation's ability to produce crude oil be increased?

**New reserves.**—Correlations between drilling and discoveries of new oil in the postwar period indicate that the drilling of 101,000 wells in a 2-year period should add about 4,000,000,000 bbl. to our net reserves of liquid hydrocarbons.

In the period from 1947 through 1951, operators drilled 199,733 wells. Total new oil found by this drilling, including discoveries plus extensions and revisions, averaged about 92,000 bbl. for each well drilled. Variations from this average by years ranged from 82,000 bbl. per well to 107,000 bbl. per well.

A projection of new-oil findings for the next 2 years on a basis of the average for the past 5 years will give only approximate results. However, the spread covering projections based on the averages for the high and the low years should include final totals for the period.

Total liquid production in 1951, including the L.P.G. left in pipe-line gas, amounted to about 2,470,000,000 bbl. Estimated annual increases of 5 per cent for this year and next raise the production for the 1952-53 period to 5,300,000,000 bbl.

If industry drills 101,000 wells by the end of next year and if we use the minimum postwar new-oil ratio of 82,000 bbl. per well, total new oil, indicated for the period, would be 8,300,000,000 bbl. Deducting 5,300,000,000 bbl. for total production, net reserves would be increased 3,000,000,000 bbl. If the top ratio of 107,000 bbl. per well is used, total new oil for the period would be 10,800,000,000 bbl. or a net gain in reserves of 5,500,000,000 bbl.

This comparison with previous years indicates that the net addition to reserves of total liquid hydrocarbons from the drilling of 101,000 wells would fall somewhere between 3,000,000,000 and 5,500,000,000 bbl., probably near the 4,000,000,000 bbl. mentioned above.

**Productive capacity.**—It is difficult to determine, in barrels per day, just how much additional crude production could be sustained by an increase in reserves of 4,000,000,000 bbl. However, PAD estimated that the 80,000 wells will increase producibility by 642 000 bbl. daily. Using this same ratio, 101,000 wells in the next 2 years would add about 800,000 bbl. daily to the producing capacity.

On the other hand, gains in crude production may use up a large share of this increased capacity. Crude production increased 745,000 bbl. daily in 1951 and the general forecast is that rising demands will require a further increase of about 300,000 bbl. daily during 1952. On the assumption that demand will continue to increase at about the same rate, domestic crude production should gain another 315,000 bbl. daily in 1953. With production up better than 600,000 bbl. daily, the increase in reserve producing capacity for the 2-year period will be cut to less than 200,000 bbl. daily.

**Seasonal drilling.**—For the past few years, completions in the last 6 months of the year have represented about 53.4 per cent of total drilling for the year. Winter weather in the first quarter cuts into drilling more than at the end of the year. Also, the general upward trend gives a larger completion rate in the last quarter.

The PAD schedule called for 25,000 wells in the last half of 1952 and 55,000 for the year 1953. If the split between the first half and last half of the year is about the same as it has been since the war, completions in the last half of 1953 will reach 29,370 wells, or 17.4 per cent greater than the 25,000 expected in the last half of this year.

For comparison with a known half year, drilling required in the last half of 1953 will be almost 24 per cent more than in the last 6 months of 1951.

**Problem of rigs.**—The drilling rate called for by PAD will require the use of far more rotary rigs than have ever been employed before.

The average number of rotary rigs operating in the United States in the last half of 1951 was 2,816 compared with 2,283 rigs in the last half of 1950. Thus, it required an increase of 23 per cent in active rotary rigs to secure a gain of 3 per cent in total well completions.

Obviously, this ratio of rig increases to completion increases cannot be continued in a program that calls for more than 29,000 wells in the last half of 1953. To increase rigs 23 per cent for every increase of 3 per cent in completions would mean that the average number of rigs operating in the last half of 1953 would need to be about 180 per cent greater than in the last half of 1951, or about 7,800 rigs.

Even if the number of rigs increases directly with the number of completions, the average for the last half of 1953 would be about 3,500 rigs, almost 700 rigs more than in the last half of 1951.

Replacement of rigs either as completely new rigs or major replacements on several rigs will call for the construction of at least 300 rigs a year. For 1952 and 1953, replacement of 600 rigs combined with required expansion of about 700 will call for the building of at least 1,300 rigs in the 2-year period.

Since it takes more rig time to drill a wildcat than a comparable development well, the increase in the number of rigs in operation will be greater than the increase in completions if a larger percentage of the total drilling is exploratory.

**More wildcats.**—The ratio of wildcats to development wells is going up, which should mean more new discoveries but not necessarily a proportionate increase in proven reserves within the period of the PAD program.

Operators indicated that drilling programs for 1952 call for about 24 per cent wildcats compared with 23.1 per cent in 1951 and 19.8 per cent in 1950. PAD based its 80,000-well program on a wildcat ratio of 24 per cent.

Actual results from wildcat drilling often are not evident by the end of the year in which the drilling was done. Important discoveries may not have enough confirmation drilling in the year of discovery to prove up more than a small area near the discovery well. Later development drilling will prove or disprove the existence of a major pool. This fact is taken into consideration in reporting proven reserves. For the last 5 years, the amount of new oil credited to extensions and revisions has been between four and five times the total for new discoveries.

Important discoveries in a given year will be followed by expanded development programs. The fact that wildcat drilling has accounted for increasingly larger percentages of total drilling each year since 1946 seems to indicate that it is taking fewer field wells to develop some of the pools that have been discovered.

## Imports Drop

### Slight decrease noted in December by Census Bureau

BOTH imports and exports of crude and products decreased slightly in December, according to data released by the Census Bureau of the Department of Commerce.

Total exports, excluding shipments to territories, averaged 387,000 bbl. daily in December compared with 390,000 bbl. daily in November and with the postwar record of 523,000 bbl. daily in August 1951. Exports have decreased each month since August.

Exports of crude averaged 69,300 bbl. daily for an increase of 7,400 bbl. daily over November. The only other major product increase was for distillate fuel, up 19,300 bbl. daily to 58,800 bbl. daily. Gasoline was off 17,200 bbl. daily.

Total imports for December decreased 20,000 bbl. daily to 796,000 bbl. daily with the increase in product receipts slightly less than the decrease for crude.

Daily average for crude imports in December was 386,000 bbl., the smallest average for any month since the 373,000 bbl. reported for March 1949.

Except for the small increase in crude from Kuwait, the averages for all countries were smaller in December than in November. No crude was reported from Saudi Arabia in December.

Residual imports averaged 388,400 bbl. daily in December, the highest level since the closing of the Abadan refinery cut world supply of heavy fuel. However, the total for December was well below that of December 1950. Residual imports were 323,700 bbl. daily greater than exports this December compared with a net of 366,500 bbl. daily for the same month a year earlier.

**IMPORTS INTO CONTINENTAL UNITED STATES**
(Thousands of barrels)

| | Dec. 1951 | Nov. 1951 | Dec. 1950 |
|---|---|---|---|
| Crude— | | | |
| Mexico | 1,268 | 1,255 | 1,100 |
| Colombia | 819 | 1,510 | 1,339 |
| Venezuela | 8,311 | 8,544 | 8,118 |
| Kuwait | 1,172 | 1,036 | 2,864 |
| Saudi Arabia | | 204 | 1,763 |
| Borneo | 325 | 442 | |
| Canada | 58 | 177 | 1 |
| Total crude | 11,953 | 13,168 | 15,185 |
| Daily average | 386 | 439 | 490 |
| Products— | | | |
| Residual fuel | 12,040 | 10,682 | 12,689 |
| Other products | 683 | 617 | 1,059 |
| Total products | 12,723 | 11,299 | 13,748 |
| Daily average | 410 | 377 | 443 |
| Total all oils | 24,676 | 24,467 | 28,933 |
| Daily average | 796 | 816 | 933 |

**EXPORTS***

| | Dec. 1951 | Nov. 1951 | Dec. 1950 |
|---|---|---|---|
| Crude | 2,147 | 1,858 | 2,917 |
| Gasoline | 3,442 | 3,846 | 2,104 |
| Kerosine | 385 | 484 | 214 |
| Distillate fuel | 1,821 | 1,184 | 795 |
| Residual fuel | 2,006 | 1,962 | 1,326 |
| Lube oils | 1,430 | 1,476 | 1,426 |
| Other products | 751 | 875 | 587 |
| Total all oils | 11,982 | 11,685 | 9,369 |
| Daily average | 387 | 390 | 302 |

*Excludes shipments to territories.

# CANADA

## Bright Gas Future

### Alberta reserves may be doubled in next 10 years

NEW YORK.—Alberta's proven gas reserves may be doubled during the next 10 years if adequate markets are provided.

This is one conclusion of an extensive, 20,000 man-hour survey conducted last year for Trans-Canada Pipe Lines, Ltd.

A condensation of the survey was presented last week at the American Institute of Mining and Metallurgical Engineers annual meeting by representatives of Empire Trust Co., New York, and DeGolyer & MacNaughton and Delhi Oil Corp., both of Dallas.

Recent drilling activity in Alberta has brought estimated total recoverable reserves to 11.7 trillion cubic feet as of January 1, 1952. More gas was discovered during 1946 through 1950 than in all the province's previous 63-year gas-producing history.

**Availability.**—On the basis of present proven reserves alone, the study shows estimated daily availability of gas to average 672 million cubic feet for the period 1951-1976. Composite availability in M.M.c.f. per day rises from an estimated 588 for 1952 to 889 for 1959, then tapers off to an estimated 456 for 1975. This future estimate, the authors said, cannot be viewed as a prediction of the actual amounts of gas which will become available. Natural-gas supplies in Alberta unquestionably will be increased substantially by future exploration.

Estimates of recoverable reserves, proved and probable, for the 8 largest fields as of January 1, 1952, are presented in the accompanying table.

**ESTIMATED RECOVERABLE RESERVES, PROVED AND PROBABLE**

| Field— | Discovery date | Reserves (M.M.c.f.) |
|---|---|---|
| Pincher Creek | 1948 | 2,204,115 |
| Leduc-Woodbend | 1947 | 1,326,572 |
| Cessford | 1949 | 1,092,667 |
| Medicine Hat | 1890 | 1,023,167 |
| Viking-Kensella | 1914 | 844,301 |
| Jumping Pound | 1944 | 715,860 |
| Whitelaw | 1950 | 599,092 |
| Turner Valley | 1914 | 554,091 |

Detailed estimates of associated and nonassociated gas reserves by producing reservoir in 24 major fields were reported. These, plus reserves estimated for the province's 80 minor fields and prospects, gave investigators a total of 11,687,114 M.M.c.f. for proved and probable reserves. Proved, probable, and possible reserves were estimated at 16,146,853 M.M.c.f. Estimated gas available for sale totaled 9,440,283 M.M.c.f.

## More Wildcatting Expected

CALGARY, Alta.—It is doubtful that the oil industry in Alberta will be able to maintain in 1952 the high successful-completion percentage it has chalked up the past 2 years.

Last year 763 producers were completed in 1,179 attempts for a batting average of about 64 per cent. This was about 10 per cent under 1950's percentage when 752 producers were finaled in 1,009 tries, according to the Alberta Petroleum and Natural Gas Conservation Board.

A major portion of the successful completions during both 1950 and 1951, however, were in the province's two principal fields, Redwater and Leduc. Redwater reached its peak of development during 1950, and it is expected that Leduc will be almost fully defined this year. This means that large new fields must be discovered this year if operators are to keep up the present pace.

The effect of Redwater development on the completion percentage is shown by the conservation board's figures. In 1950, the field accounted for 455 of the 752 producers, while only 165 of the 763 producers completed last year were credited to it.

The rapid decline in Redwater development, which resulted in increased wildcatting in the province, is advanced as one of two factors which resulted in the lower percentage of successful completions in 1951. The other is that the first real search for natural gas in Alberta was kicked off during the year.

Wildcatting efforts will almost certainly be further accelerated this year with Leduc field approaching maturity.

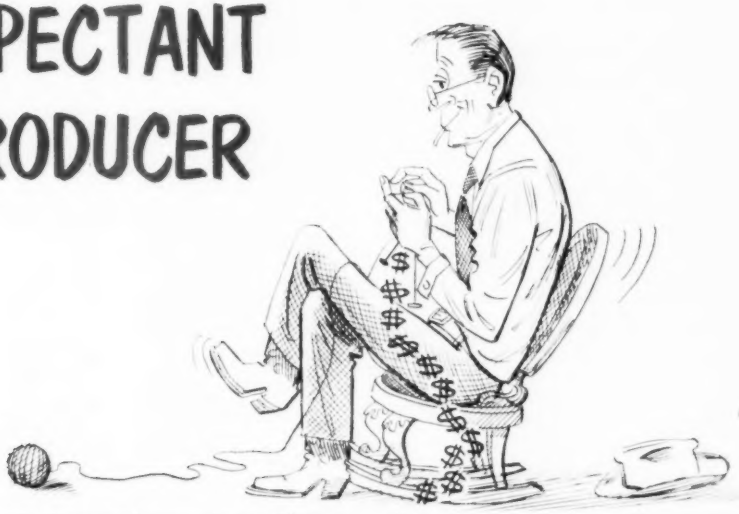
## Sulfur Plant Operating

CALGARY, Alta.—Canada's first plant designed to extract sulfur from natural gas is now in operation at Jumping Pound, Alta.

Owned by Shell Oil Co. of Canada the new plant will extract about 9,000 tons of sulfur annually from hydrogen sulfide. Production will be increased as markets for natural gas from Jumping Pound field expand.

Canada currently imports about 50 per cent of its sulfur from the United States.

# THE CASE OF THE EXPECTANT PRODUCER



Expecting his newly discovered reservoir to add up — barrel for barrel, dollar for dollar? Perhaps. But it's a long pull from bottom of the hole to the bank.

There's a lot more to learn about a reservoir, other than the fact that it is commercially productive.

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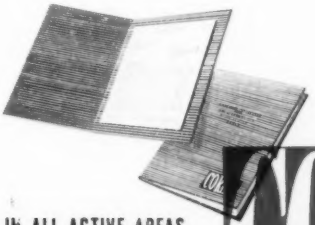

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# World Production Drops

## December's daily output of 11,881,000 bbl. is 126,000 bbl. less than November, but upward trend is expected

Dahl M. Duff

A DROP of 126,000 bbl. daily in total world output of crude oil occurred in December, due to production declines both in the United States and in two important Middle East countries—Saudi Arabia and Kuwait.

Total production averaged approximately 11,881,000 bbl. daily, as compared to a record high of 12,007,400 bbl. daily the previous month. In the United States December production was down 56,700 bbl. daily, while total foreign output showed a decrease of 69,400 bbl. daily.

The decline occurring in December is regarded only as a temporary interruption to the net upward trend of world crude-oil output. The industry is still engaged in the task of replacing what was lost in Iran and providing for the additional normal growth of world demand.

Even at the somewhat reduced total in December, world production was only about 122,000 bbl. daily below the total for June, the last month prior to the stoppage of Iranian production. In December, Saudi Arabia was producing 853,800 bbl. daily, and Kuwait, 673,000 bbl. daily. Production in both these major areas was considerably below maximum potential output.

Total foreign production exclusive of Russia and eastern Europe in December averaged 4,640,100 bbl. daily. This was about 70,000 bbl. daily below the previous month. It compares to a high for non-Communist foreign production of 4,878,400 bbl. daily reached last May.

**New area opened.**—A new producing area entered the world-production column in December. It is Zubair field in southern Iraq which is connected by pipe line to Fao, an outlet to the Persian Gulf. Zubair field, operated by Basra Petroleum Co., Ltd., an Iraq Petroleum Co., Ltd., affiliate, is destined to grow in importance and is expected to become eventually one of the major oil areas of the Middle East.

First commercial production from Zubair was in mid-December when shipments commenced from Fao. Spread over the entire month, the daily average was 13,500 bbl. daily. With Kirkuk currently producing at the maximum allowed by the existing 12 and 16-in. lines to Tripoli, total production for Iraq rose to a new record of 192,400 bbl. daily. Included also in this figure is about 8,200 bbl. daily estimated production of Naft Khaneh field.

Of significance was the continued rising trend of production of two countries—Qatar in the Persian Gulf, and Italy. Qatar production rose to a new record of about 58,000 bbl. daily

### WORLD CRUDE-OIL PRODUCTION
(In thousands of barrels daily)

| Country— | Dec. 1951 | Nov. 1951 | Dec. 1950 |
|---|---|---|---|
| Western Hemisphere: | | | |
| Argentina | 70.0 | 70.0 | 71.2 |
| Bolivia | 1.6 | 1.6 | 1.7 |
| Brazil | 1.5 | 1.4 | 0.7 |
| Canada | 133.7 | 137.0 | 82.8 |
| Chile | 2.1 | 2.1 | 1.7 |
| Colombia | 101.2 | 96.1 | 103.0 |
| Cuba | 0.1 | 0.1 | 0.3 |
| Ecuador | 8.2 | 8.2 | 7.2 |
| Mexico | 215.1 | 210.0 | 211.1 |
| Peru | 45.4 | 45.4 | 43.1 |
| Trinidad | 57.2 | 57.6 | 57.5 |
| Venezuela | 1,776.4 | 1,754.2 | 1,622.4 |
| Total | 2,412.5 | 2,383.7 | 2,202.7 |
| Europe and Africa: | | | |
| France | 6.4 | 6.3 | 3.7 |
| French Morocco | 1.9 | 1.9 | 0.9 |
| Germany | 29.1 | 28.8 | 23.4 |
| Italy | 0.7 | 0.6 | 0.1 |
| Netherlands | 11.7 | 13.7 | 12.8 |
| Egypt | 45.8 | 46.1 | 46.2 |
| United Kingdom | 1.1 | 1.0 | 0.9 |
| Total | 96.7 | 98.4 | 88.0 |
| Middle East: | | | |
| Bahrein | 30.2 | 30.2 | 29.9 |
| Iran | 36.0 | 75.0 | 726.7 |
| Iraq | 192.4 | 177.9 | 166.8 |
| Kuwait | 673.0 | 705.1 | 403.7 |
| Qatar | 57.8 | 55.0 | 43.5 |
| Saudi Arabia | 853.8 | 896.7 | 617.9 |
| Turkey | 0.5 | 0.5 | 0.4 |
| Total | 1,843.7 | 1,940.4 | 1,988.9 |

| Country— | Dec. 1951 | Nov. 1951 | Dec. 1950 |
|---|---|---|---|
| Other Asia: | | | |
| British Borneo | 104.0 | 103.7 | 94.0 |
| Burma | 2.0 | 2.0 | 2.0 |
| China | 2.2 | 2.2 | 2.0 |
| India | 5.0 | 5.0 | 5.0 |
| Indonesia | 160.0 | 160.0 | 140.0 |
| Japan | 5.8 | 6.0 | 6.0 |
| New Guinea | 4.9 | 4.9 | 4.7 |
| Pakistan | 3.3 | 3.2 | 3.4 |
| Total | 287.2 | 287.0 | 257.1 |
| Total foreign less Russia and E. Europe | 4,640.1 | 4,709.5 | 4,536.1 |
| Estimated Russia and Eastern Europe: | | | |
| Austria | 43.0 | 43.0 | 32.0 |
| Romania | 90.0 | 90.0 | 85.0 |
| Russia | 860.0 | 860.0 | 775.0 |
| Other E. Europe | 33.2 | 33.2 | 24.1 |
| Total | 1,026.2 | 1,026.2 | 916.1 |
| Total foreign | 5,666.3 | 5,735.7 | 5,452.8 |
| United States | 6,215.0 | 6,271.7 | 5,718.6 |
| World total | 11,881.3 | 12,007.4 | 11,171.4 |

Figures are from reliable reports in the industry or official government sources. Data for Russia and Eastern Europe are based on competent estimates; no authentic information is available on month-to-month production in these areas. Completely current reports also are lacking for certain countries of Southeast Asia. Data for earlier months have been revised where necessary.

in December, and further increases are anticipated in this shaikhdom. Qatar began commercial production about 2 years ago and has been producing around 48,000 bbl. daily since.

In Italy, December production was estimated at 600 bbl. daily. This represented a marked gain over the approximately 200 bbl. daily output which has been the total for this country for years. The additional crude apparently is coming from newly developed areas in the Po Valley, most of which, however, produce gas and condensate.

**Venezuela gains.**—Venezuelan production in December rose to another new record, the twelfth which has been established in the last 13 months. The December daily average was 1,776,400 bbl. This was an increase of 22,200 bbl. daily, or about 1.3 per cent, over the previous month.

The daily average production in Venezuela for 1951 was 1,704,600 bbl. If Venezuelan output continues at approximately the same rate of gain during 1952, production will be close to 2,000,000 bbl. daily by the end of the year.

Weekly production figures for Venezuela were: Week ended December 3, 1,757,205 bbl. daily; December 10, 1,696,700 bbl. daily; December 17, 1,790,600 bbl. daily; December 24, 1,804,762 bbl. daily; and December 31, 1,793,200 bbl. daily. The 1,804,762 bbl. daily produced during the week ended December 24 was a record for any single week of 1951.

The decline in production in Venezuela during the week ended December 10 was due to a break in one section of the Anaco-Puerto La Cruz pipe line.

Production in Colombia recovered part of the loss it sustained in November when total output dropped to about 96,000 bbl. daily. December production, excluding De Mares condensate, was 101,200 bbl. daily. Production by concessions was: De Mares, 35,882 bbl. daily; Barco, 23,497 bbl. daily; Yondo, 37,838 bbl. daily; Cantagallo, 1,227 bbl. daily; Dificil, 1,748 bbl. daily; and Velasquez, 1,035 bbl. daily.

**Canada.**—Canadian production in December continued well below the levels of last summer due to the fact that the eastern pipe-line outlet is restricted when shipping is closed on the Great Lakes.

Preliminary reports showed Mexican production in December to be 215,100 bbl. daily.

Crude output in the Netherlands dropped back to about 11,700 bbl. daily as compared to between 13,000 and 14,000 bbl. daily during most of the other months of the year. All the oil comes from Schoonebeek field near the German border. The exploration program which the Shell and Jersey Standard affiliate has conducted for the last several years in the Netherlands has resulted in the discovery of gas reserves, and plans are now being made to market this gas production.

**VENEZUELAN PRODUCTION**
(Figures of the Ministry of Mines and Hydrocarbons, showing production in barrels by operators)

| Company— | December | 1951 |
|---|---|---|
| Creole | 801,866 | 773,663 |
| Shell | 567,933 | 527,321 |
| Mene Grande | 244,076 | 245,273 |
| Socony-Vacuum | 54,247 | 49,319 |
| Texas | 24,251 | 23,625 |
| Mercedes | 23,857 | 23,177 |
| Atlantic | 18,032 | 18,932 |
| Richmond | 8,865 | 13,489 |
| Sinclair | 13,272 | 12,481 |
| Pantepec | 8,672 | 10,042 |
| Phillips | 7,361 | 6,371 |
| B.C.O. | 954 | 949 |
| Total | 1,776,386 | 1,704,642 |

Production of crude oil in Western Germany in December showed little change from the previous month. The month's total production was 29,100 bbl. daily. By areas, production, in metric tons, was: Lower Saxony, excluding Emsland, 60,324; Emsland, 55,548; Hamburg, 3,949; Schleswig Holstein, 5,840; and Baden, 512.

**Satellite areas.**—Several reports in recent months indicate that the Russian-controlled production of Austria is upwards of 42,000 bbl. daily. Estimates beyond this figure range on up to nearly 50,000 bbl. daily. There appears to be little doubt that the Soviet Mineral Oil Administration has had considerable success in developing several Austrian fields, including Matzen.

One recent report from Vienna said that Austrian production during the latter part of the year rose to about 220,000 bbl. daily due to increased output of Alderklaa and Matzen. These two areas were said to be producing about 20,000 and 140,000 tons a month respectively. The old Zisterdorf area was credited with current production of about 60,000 tons a month.

Available information suggested that the Communist oil industry of neighboring Hungary is encountering increasing difficulties. It appears that current output is well below the 11,500 bbl. daily produced by the Standard Oil Co. (N. J.) affiliate before the Communists gained control of the government. One report recently said the former Shell refinery at Csepel had reduced runs due to a shortage of crude.

**TREND OVER LAST YEAR**

| 1951— | W. Hemisphere less U. S. | Middle East | Total foreign less Russia and E. Europe |
|---|---|---|---|
| January | 2,210.9 | 1,874.2 | 4,450.9 |
| February | 2,220.3 | 1,947.4 | 4,536.8 |
| March | 2,254.1 | 1,961.1 | 4,581.1 |
| April | 2,261.5 | 2,013.4 | 4,632.1 |
| May | 2,314.0 | 2,203.8 | 4,878.4 |
| June | 2,335.5 | 2,172.4 | 4,877.8 |
| July | 2,374.5 | 1,835.5 | 4,579.0 |
| August | 2,388.0 | 1,789.7 | 4,555.3 |
| September | 2,396.3 | 1,741.7 | 4,517.6 |
| October | 2,395.6 | 1,810.6 | 4,585.6 |
| November | 2,383.7 | 1,940.7 | 4,709.5 |
| December | 2,412.5 | 1,843.7 | 4,640.1 |

# Optimistic Outlook

## Oil industry's future in Middle East is much brighter than current unrest there would indicate, A.I.M.E. told

DESPITE the situation in Iran and occasional day-to-day difficulties elsewhere in the Middle East, the industry has reason to be optimistic over the long-term political outlook in this region, Alex Chapman, government-relations official of Arabian American Oil Co., said in New York this week.

The governments and peoples of the Middle East are gradually getting a better appreciation of the job the industry is doing, he said. The United States' effort, which is entirely divorced from colonialism, is beginning to be recognized. The position of the British companies also is improving.

Chapman's remarks were made before the petroleum division of the American Institute of Mining and Metallurgical Engineers at a symposium on world-wide oil developments held during the institute's annual meeting. He was one of five speakers who discussed foreign-oil activities.

Chapman made it clear that in most respects the industry's engineering and operating problems in the Middle East are the easiest. The more difficult task is that of creating an atmosphere with the governments and the peoples which will enable the industry to work in peace and stability.

**Reserves.**—As for the crude reserves of the Middle East. He said it is virtually impossible to set them down on paper because something new happens "before the ink is dry." The fact is that for a long time in the future production will be limited by available facilities and demand and not by the reserves themselves.

He cited three examples of recent exploration activity in the region. While there are the usual difficulties of evaluating a one-well discovery, Kuwait Oil Co., Ltd.'s Magwa test has apparently extended considerably to the North Burgan field, a complex, or series of fields.

In Saudi Arabia, recent drilling has made it appear even more likely that Ain Dar and Uthmaniyah are one single field 65 miles in length and 10 to 15 miles in width. In Qatar,

a well is being drilled 20 miles to the south of Dukhan. If successful, it will give this field an over-all length of approximately 46 miles.

Prior to the Iranian shutdown, total production of the Middle East, amounting to about 2,000,000 bbl. daily, was coming from only 402 wells. However, Chapman said, the very wide spacing makes the per acre withdrawal about the same as in the more prolific fields in the United States. In Abqaiq, it is about 6 bbl. per acre per day.

**Far East.**—Political difficulties which retard development in the Far East were brought out by E. W. Berlin, production manager of Standard Vacuum Oil Co. In Indonesia, he indicated the issue is not so much nationalization as it is the formulation of a new mining law which will represent a complete break with the Dutch philosophy.

He said that there has been a change from a realistic attitude to a completely greedy approach, a condition which he said does not promote foreign investment. However, he said, the people are basically reasonable, and an eventual satisfactory solution can be hoped for.

Production of the Far East in 1951 amounted to 286,000 bbl. daily, Berlin said. North Sumatra, which once produced the best lubricating-oil crude in the Far East, is still closed. All the Indonesian production of 149,000 bbl. daily came from South Sumatra except 15,000 bbl. daily from Indonesian Borneo and 12,400 bbl. daily from Java.

**Canada.**—Preliminary estimates show Canadian reserves at the end of 1951 to be about 1.3 billion barrels, according to Don Wilson, production adviser, Imperial Oil, Ltd., Toronto, who reviewed developments in this extremely active country. Approximately 150,000,000 bbl. were found in new discoveries, 225,000,000 bbl. added by field extensions and revisions of previous estimates, while total production amounted to about 50,000,000 bbl.

Last year, 478 exploratory wells were drilled in western Canada, resulting in 68 oil discoveries or extensions, and 78 gas discoveries or extensions. Geophysical crews active ranged up to a maximum of 153, and averaged 134 during the year, a 25 per cent increase over the previous year.

Wilson said the area in western Canada held under permit or lease increased about 39,000,000 acres last year to a total at the end of the year of 168,000,000 acres. Tracing the 1951 activity, he pointed out there had been three principal land plays:

One was in the Williston basin which was touched off by the discovery of light oil in southwestern Manitoba. Another was in northwestern Alberta, northeastern British Colombia, and the Northwest Territories. This was due to the discovery in the Fort St. John, B. C., area and also to competition for remaining available acreage. The third play was in Central Alberta southeast of Edmonton where intense competition pushed land prices to spectacular levels.

**Europe.**—F. von Estorff, Socony-Vacuum Oil Co., Inc., geologist gave an estimate of 1,000,000 bbl. daily current production for Europe and Russia, including 50,000 bbl. daily for non-Communist Western Europe. Principal Western European producer is Germany where about 30,000,000 acres are under exploration and development. He pointed out German development is stimulated by the controlled price of about $6 a barrel received by the producer.

Exploration work in the Netherlands, second largest Western European producer, has resulted in six gas discoveries, some from 9,000 to 10,000 ft. Marketing plans for the gas are now being made. In Sicily, exploration programs are being carried out by Gulf and Anglo-Iranian with drilling likely in the near future.

Austrian production of about 40,000 bbl. daily all comes from the Soviet zone where Shell and Socony-Vacuum still own two refineries. Crude is bought from the Russians, and the products sold to Russian interests at controlled prices. Romania's output of about 85,000 bbl. daily is some 55,000 bbl. daily above the domestic demand.

**Latin America.**—In Colombia, most of the 1951 production gain was from Shell's Yondo properties, and total reserves in the country are now about 450,000 bbl. J. B. Gilmore, DeGolyer & MacNaughton, told the A.I.M.E. group. Most promising Colombian discovery was International's Totumal strike which produced 550 bbl. of 25°-gravity oil on a ½-in. choke in 12 hours. Of the six wildcats drilled last year in Colombia, three were successful.

New concessions, if granted, will spur exploration in Venezuela. About 110 rigs were in operation in Venezuela at the end of the year. In Brazil, all signs point to continued developmen by Brazilians and national capital. In Chile, where 50 wells have been drilled to date, 8 fields have been discovered. In Uruguay, 17 party months of geophysical work have been completed, and mapping of anomalous features in the Northwest Uruguayan basin will continue in 1952.

## MIDDLE EAST

# 50-50 Deal Approved

### Iraq parliament ratifies agreement with I.P.C. for a 50-50 split of company's profits before foreign taxes

THE Iraq Parliament this week gave final approval to the new 50-50 participation agreement negotiated by the government last summer with Iraq Petroleum Co., Ltd.

As had been anticipated, there was opposition from extremist and nationalist groups, but the Constitutional Union party of Prime Minister Nuri Al Said carried the ratification.

The vote in the Chamber of Deputies was 89 to 7 in favor of approval. There was only a single dissenting vote in the Senate. However, in both branches, several opposition members walked out or abstained from voting.

After the ratification, groups which had been fighting the agreement began agitation for a public strike in protest to the parliamentary action. Earlier five deputies representing the Istiqlal party resigned. This group has been demanding nationalization of the Iraqi oil industry on the same basis as in Iran.

The new agreement was first revealed last August (*The Oil and Gas Journal, August 22, 1951, page 105*). It is retroactive to the beginning of 1951, and its ratification gives a definite long-term basis for future company operations.

**Considered liberal.**—The agreement is considered to be the most liberal yet negotiated. It stands as an example to Iran, where the government rejected company proposals and seized the industry properties. Kuwait has reached a profit-sharing agreement with Kuwait Oil Co., Ltd., along lines similar to that in Iraq. Observers in the industry anticipate modification of the original 50-50 profit-sharing agreement reached a year ago in Saudia Arabia.

Under terms of the Iraq agreement, the government receives 50 per cent of the company's profits before any deduction for foreign taxes. Formulas are established to calculate the value of the production at the Iraqi borders and the costs of the operation. The agreement brings together what heretofore were three separate agreements for each concession—that held by I.P.C. itself, and its two associated companies, Basra Petroleum Co., Ltd., and Mosul Petroleum Co., Ltd.

Iraq obtains the only basic royalty now existing in the Middle East on a

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percentage, rather than a fixed-value per ton, basis. The government gets 12½ per cent of the oil available for export. This can be sold on the world market, or the companies can be called on to buy it back at posted seaboard prices.

**Income guarantees.**—There are several minimums which guarantee Iraqi income. The companies are committed to produce 22,000,000 tons from the I.P.C. and Mosul areas beginning in 1954, and 8,000,000 tons from the new Basra area beginning in 1955. This will amount to a total of about 600,000 bbl. daily when both areas reach their agreed production.

The company has also assured the government that its total income from the operations will not be less than 25 per cent of the seaboard value of all crude exported by I.P.C. and Mosul Petroleum, and 33⅓ per cent of the seaboard value of exports by Basra Petroleum. If *force majeure* requires a suspension of production, the companies will pay a minimum of 5,000,000 dinars ($14,000,000) annually for 2 years.

Other provisions call for Iraqi representation on the I.P.C. board and for additional training of Iraqis in the industry. Iraq, which is planning construction of a refinery of about 25,000 bbl. daily capacity at Baghdad, is given the privilege of buying crude to meet needs for internal consumption at about 11 cents a barrel, or the equivalent of the pipe-line transportation charge.

The difference between the seaboard value of the 12½ per cent share of crude and the total 50 per cent of profit will be received by the government in cash as taxes or by other means. The I.P.C. partners are expected to establish companies to meet these payments.

Iraq's total revenue under the agreement is scheduled to rise to the equivalent of $165,200,000 annually by 1955. By 1953, when total revenue to the government will be about $126,000,000, per barrel income will be approximately 73 cents. The revenue which the country will receive from its petroleum industry in a few years will be about double the entire current annual budget.

# Stalemate Broken

## Iran, World Bank reach partial agreement on settlement of oil-nationalization issue; negotiations to continue

AGREEMENT on a number of points toward a possible settlement of the Iranian oil-nationalization question was announced last week in a joint statement in Teheran by the Iranian Government and representatives of the International Bank for Reconstruction and Development.

The statement said a partial settlement had been agreed on and that negotiations would continue for a full settlement of the dispute with Britain over operation of the expropriated oil properties. Discussions have been held since early January "in an atmosphere of cordiality and good will" and "a frank exchange of views has clarified the respective positions of the Iranian Government and the bank."

Since the statement gave no details on whatever agreements have been reached, it was impossible to assess the progress made toward resolving the issue. The statement spoke of a full settlement of the dispute, but it had been understood that the bank was attempting to reach temporary agreement which would permit interim resumption of operations.

There seemed to be little question that the bank's representatives were making a strong bid to reach some kind of agreement with the Iranians. The two top members of the bank mission, Robert L. Garner and Hector Prudhomme, left Teheran the latter part of the week for Washington, presumably to contact the British for their reaction to Iranian counterproposals.

**Second attempt.**—It was the bank's second attempt at settlement. The proposal calls for resumption of operations under bank management pending a final settlement. Revenue would be split between the bank, the Iranian Government, and the bulk buyer of the oil, presumably Anglo-Iranian Oil Co., Ltd.

Three unsuccessful attempts to reach an agreement with the Mossadegh Government were made last summer. First was the Anglo-Iranian Oil Co., Ltd., mission headed by B. R. Jackson. He was followed by W. Averell Harriman, representing President Truman, and finally by the British Government delegation led by Richard Stokes.

**Assassination.**—The most outspoken proponent of oil nationalization, Hussein Fatemi, was shot by an assassin in Teheran last week. Fatemi's assailant was identified as a young fanatic representing an extremist Moslem organization whose leader has been imprisoned by the Mossadegh Government. Fatemi was in a critical condition in a Teheran hospital.

**Bank warned.**—While the World Bank group was negotiating in Teheran, Sen. Alexander Wiley of Wisconsin, ranking Republican member of the Senate foreign-relations committee, made public in Washington a letter he had sent to Eugene Black, bank president, warning that a settlement under bank auspices in Iran might encourage confiscation of oil properties elsewhere throughout the world.

## LATIN AMERICA

# Venezuelan Drilling

## Increased tempo expected; 106 rigs now in operation

DRILLING is on the upswing in Venezuela, and the tempo of activity is expected to increase in coming months.

A year ago there were 92 rigs operating in the country; now there are 106.

All companies operating in Venezuela are starting on enlarged development and exploration programs. In 1950 well completions totaled 673; last year the number climbed to 1,216, and the figure is expected to be considerably higher for 1952.

Creole Petroleum Corp., the leading operator in Venezuela, expects to increase its production this year to as much as 850,000 bbl. daily, and other companies also are stepping up their output.

A high rate of drilling is guaranteed by the continuation of exploratory programs started last year and the continuation of programs, already in effect, to drill up proven fields. New impetus would be given the activity with the granting of new concessions now under consideration by the Ministerio de Fomento and the Bureau of Hydrocarbons.

New concessions also would result in a big jump in geophysical activity, with a need for more seismograph crews, shot-hole drilling operations, field exploration parties, and surveying crews.

**Loffland active.**—An example of the increased drilling activity is the operations of Loffland Bros. Co. of Venezuela. A year ago Loffland had only one active drilling operation in the country, a labor-contract job in which Loffland furnished the tool pusher, driller, and drilling crews and the oil company supplied the rig and supplies.

Today, Loffland has 11 active drilling operations, involving 5 complete rigs and 6 labor-contract operations.

In addition, Loffland has a labor-contract operation for Richmond in Colombia and is preparing to ship a rig for barge operations in Venezuela's Pedernales field for the same company.

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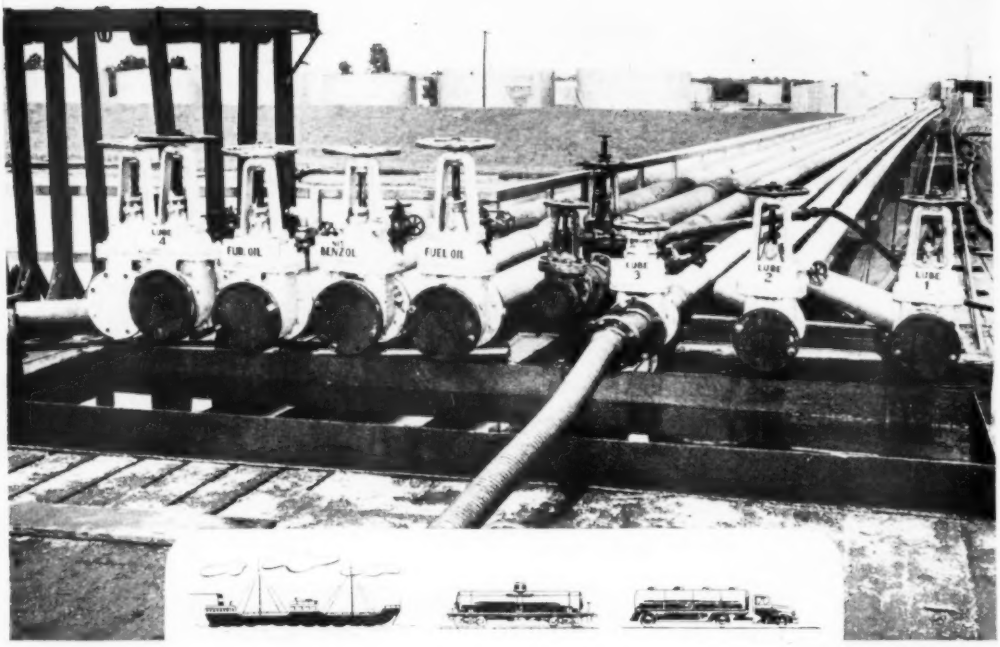


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**135 South LaSalle Street • Chicago 90, Illinois**

**WORLD'S LARGEST PUBLIC TANK STORAGE SYSTEM**

TERMINALS: Carteret, N. J., Goodhope, La., Houston and Corpus Christi, Texas, and Chicago, Ill.

## New President

### Standard Oil executive to head A.I.M.E. in 1952

M. L. HAIDER formally assumed the presidency of the American Institute of Mining and Metallurgical Engineers at the annual meeting of the organization last week in New York.

Haider, now vice president of Imperial Oil, Ltd., on March 1 will become deputy coordinator of the world-wide producing activities of Standard Oil Co. (N.J.), with headquarters in New York City.

Haider was born in Mandan, N. D., in 1904 and obtained a B.A. degree from Stanford University in 1927. After a short period in the cement industry, he joined Pan-American Petroleum Co. in California as a gas-testing engineer.

In 1929 he joined Carter Oil Co. at Tulsa, and was named chief engineer in 1936. Two years later he was made manager of production engineering and research for Standard Oil Development Co., New York. In this position he was responsible for coordinating the production engineering and research efforts of the producing affiliates of Standard Oil Co. (N.J.).

In 1945 he was named executive assistant in the producing department of Standard Oil Co. (N.J.) and the following year joined the Canadian affiliate, Imperal Oil, Ltd., Toronto, as head of the producing department. He was elected a director of Imperial in 1948 and vice president in 1950.

Since 1936 he has been an active member of the A.I.M.E. He served as chairman of the petroleum division in 1945 and served as vice president and director of the institute during the past year.

**Paul Johnson,** party chief for Continental Oil Co. at Cortez, Colo., has been transferred to Gallup, N. M.

**Rizer Everett,** of Oklahoma City, has been named district geologist for Carter Oil Co. in Jackson, Miss. He succeeds **F. T. Holden** who has been transferred to Tulsa as southern division representative in Carter's exploration department.

**William L. Carr,** geologist for Pure Oil Co., has been transferred from Chicago to Bismarck, N. D.

**R. H. Simunick,** engineer trainee for Atlantic Refining Co., has been transferred from Odessa, Tex., to Merryville, La.

**T. R. Young,** formerly field engineer with the Foundation for Industrial Research at University of Wichita, has joined Shell Pipe Line Corp. as research engineer at Houston.

**Robert Mangold,** formerly with Shell Oil Co. and later with Independent Exploration Co., has joined D. K. Partnerships, Los Angeles, as operations manager in charge of the firm's Tejon Ranch activities.

**W. H. Mannon,** formerly field superintendent, has been appointed a vice president of Camay Drilling Co., Los Angeles.

**V. C. Larsen,** general superintendent of General Petroleum Corp.'s pipe-line division at Los Angeles, has been promoted to assistant manager of the department. Larsen joined the firm in 1919.

**Frank W. Abrams,** chairman of the board of Standard Oil Co. (N. J.), has been selected to receive the third annual Tuition Plan Award for outstanding service to education. The award was to be presented at a luncheon commemorating the twelfth annual forum of the Tuition Plan, Inc.

**Robert L. Rasnic,** formerly assistant to the manager in the office of field operations department of Stanolind Oil Purchasing Co., Tulsa, has been transferred to Casper, Wyo., as crude-oil buyer. **William B. Markham** has been appointed to succeed Rasnic in Tulsa.

**Wallace B. Mathews** has been appointed coordinator of engineering and engineering research for Standard Oil Co. (Ind.). He was formerly assistant chief engineer in the general office. **Wilbur G. Guild,** assistant chief engineer of the firm's engineering department at Whiting, Ind., and **Ben Franklin,** assistant to the chief engineer, have become assistant chief engineers. **Robert R. Penman,** head engineer of the engineering department, has been appointed head engineer.

**J. G. Powell, A. C. Stoltz,** and **C. E. Burns** have organized Central Drilling Co. at Lawrence, Ill. The field superintendent is **C. W. Dittman.**

**E. S. Walseth** has been promoted to senior production foreman in the Rocky Mountain division of General Petroleum Corp. For the past 11 years he has been at Casper, Wyo., as an engineer and production foreman.

**David Graham** and **John E. Swearingen** have been nominated for election to the board of directors of Standard Oil Co. (Ind.). Directors of the company recently voted to ask stockholders to approve a plan to increase the number of directors from 12 to

*DAVID GRAHAM*

*J. E. SWEARINGEN*

15, and Graham and Swearingen would fill two of these new positions. Graham has been financial vice president of the company since January 1 and before that was with Weyerhaeuser Timber Co., Tacoma. Swearingen is general manager of production. He joined the company in 1939, became assistant to the vice president in charge of operations in 1949, and was named to his present position in 1951.

**Paul L. Kartzke** has been appointed a vice president of Shell Oil Co. of Canada, Ltd., and becomes area manager in charge of Shell Oil Co.'s exploration and production in western Canada, with headquarters in Calgary, Alta. He succeeds **E. G. Robinson** who will retire at the end of May.

**David Graham** has joined Oceanic Oil Co. as division geologist in the South Texas area with offices at San Antonio. After spending 7 years with Amerada Republics Corp. in East and South Texas, Graham joined Slick Airways at San Antonio last year.

**Vaughn Maley** and **W. E. Dougherty,** division geologists for Humble Oil & Refining Co. in the western and southwestern Texas divisions, respectively, will exchange posts March 1. Maley will go to Corpus Christi,

# PERSONALS

and Dougherty to Midland, Tex. Maley joined Humble in 1926, and Dougherty has been with the firm since 1936.

**Homer D. Austin,** formerly engineer for Schermerhorn Oil Corp. at Tulsa, has joined Phillips Petroleum Co. at Oklahoma City in the same capacity.

**Harold Sidwell,** formerly chief engineer with Hiawatha Oil Co. at San Antonio, has joined Imperial Production Corp. in that city as general superintendent.

**William T. Eastes,** seismic party chief for Atlantic Refining Co., has been transferred from Madill to Anadarko, Okla.

**Sam B. Raitman,** independent operator, has moved his offices from Evansville, Ind., to Williston, N. D.

**Robert K. Winters,** district production engineer for Atlantic Refining Co. at DeRidder, La., has been transferred to Lafayette, La., as district production engineer of the southern Louisiana district.

**J. J. Pennington** has been appointed district exploration superintendent of The California Co.'s southwestern Louisiana district. He succeeds **R. I. Levorsen** who has been transferred to a foreign affiliate where he will fill a key position.

**Dr. Frederic L. Matthews** has been named technical director of the research section of Socony-Vacuum Oil Co.'s laboratories at Paulsboro, N. J. He had been director of research of the Merrimac division of Monsanto Chemical Co. at Boston since 1948. Dr. Matthews has been associated with Monsanto since 1939 when he entered the research department of the organic division.

**C. R. Wilcox,** geologist, has resigned from the staff of **Walter Duncan** at Mount Vernon, Ill., and will open offices at Sidney, Mont., as an independent.

**Albert E. Benson,** party chief for Amerada Petroleum Corp. at Crossett, Ark., has been transferred to Great Bend, Kans.

**J. P. Martin,** geologist for Shell Oil Co., has been transferred from New Orleans to Jackson, Miss., as division geologist.

**GOLDEN TREND OFFICERS.—Four of the leaders of the Golden Trend production chapter of the American Petroleum Institute are shown here at a recent meeting of the chapter in Lindsay, Okla. Left to right are: Emmet Hughes, of Sohio Petroleum Co., vice president; Chester Webb, of Well Perforating, Inc., secretary-treasurer; H. J. Bourke, of Warren Petroleum Corp., chairman; and H. E. Allen, of Carter Oil Co., vice chairman. Speaker at the meeting was Jack Tarner, Phillips Petroleum Co. engineer at Bartlesville, Okla.**

**Robert J. Kreuz,** formerly with Esso Standard Oil Co., has joined the Whiting, Ind., research laboratories of Standard Oil Co. (Ind.).

**J. C. Walton,** driller for Penrod Drilling Co. at Clairmont, Tex., has been transferred to Post, Tex., and promoted to tool pusher.

**Philip M. Robertson,** formerly geologist for Magnolia Petroleum Co. at Roswell, N. M., has joined American Liberty Oil Co. at Dallas in the same capacity.

**Gerald I. Freeze,** engineer for Phillips Petroleum Co. at Hobbs, N. M., has been promoted to assistant superintendent at Pauls Valley, Okla.

**Charles Pinkner,** district foreman for Sun Pipe Line Co. at Premont, Tex., has been transferred to Corpus Christi, Tex., and promoted to area superintendent.

**David B. Wilkie, Jr.,** formerly junior engineer for Skelly Oil Co. at Hobbs, N. M., has joined Venezuelan Atlantic Refining Co. at Ruiz Caracas, Venezuela, as engineer.

**Lee S. Carter,** formerly valuation engineer for the Bureau of Internal Revenue at Dallas, has joined Quintana Petroleum Corp. at Victoria, Tex., as production engineer.

**V. T. Jones, Jr.,** zone petroleum engineer for Gulf Refining Co. at Harvey, La., has been transferred to Lafayette, La., and promoted to assistant area production superintendent of Gulf's production division.

**Kenneth L. Gow,** formerly division geologist with Superior Oil Co. at Denver, has opened offices as petroleum geological and engineering consultant at Houston. He will specialize in exploration and valuation work in the Gulf Coast and Rocky Mountain states.

**Ray Chorney,** formerly district geologist and manager for Wilshire Oil Co., has resigned and opened offices at Billings, Mont., as consulting geologist in the Rocky Mountain area.

**William R. Franey,** mechanical engineer with Stanolind Oil & Gas Co. at Tulsa, has been transferred to Ellinwood, Kans., and promoted to field engineer.

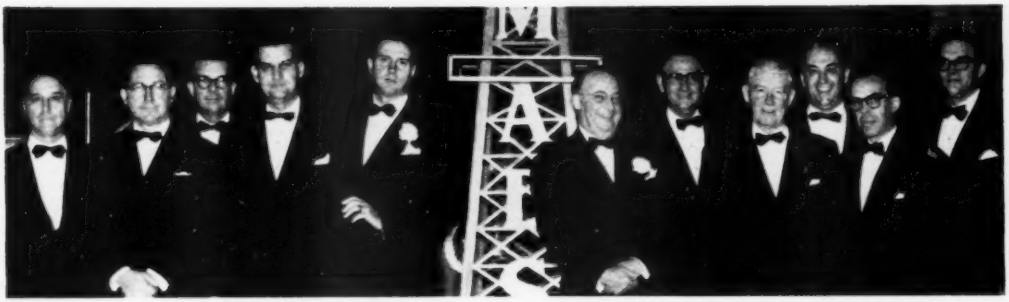
**H. E. Wolfe,** formerly district superintendent for Republic Natural Gas Co., has joined D. R. Lauck Oil Co. as production manager with headquarters at Ellinwood, Kans.

**Don Edstrom,** district geologist for British-American Oil Producing Co. at Casper, Wyo., has been transferred to Tulsa and promoted to administrative geologist. He has been with British-American in the Rocky Mountains since 1948 and earlier was with Sinclair Oil & Gas Co.

**James Donald Clark,** formerly reservoir engineer for Stanolind Oil & Gas Co. at Houston, has joined Union Oil Co. of California as division reservoir engineer at Houston.

**Hiram J. Carson** has been granted a leave of absence from Northern Natural Gas Co. and has resigned his position as first vice president and director of Northern and as director of the subsidiary company, Peoples Natural Gas Co. Carson reaches his normal retirement date on December 1, 1952, and the leave of absence will be effective until that time. He has been in the electric and gas industry since 1911.

# PERSONALS



**NOMADS OFFICERS.—New officers of the Houston chapter of Nomads who were installed at the group's annual banquet held recently at the Shamrock Hotel are, left to right: E. F. Baldwin, secretary; Madden T. Works, assistant secretary; Harry E. Estes, executive secretary; Herschel J. Wood, president; Robert K. Franklin, vice president; Noble Endicott, regent; C. L. Clausel, treasurer; E. L. Lorehn, regent; Fred Christanelli, sergeant-at-arms; Ed Louden, assistant sergeant-at-arms; and W. L. Childs, assistant treasurer.**

**Bernard Moroz,** engineer for British-American Oil Producing Co., has been transferred from Oklahoma City to Seymour, Tex.

**John C. Powell,** oil producer who retired 2½ years ago, has reopened offices at Mattoon, Ill.

**T. E. Brinson,** field gager for Sinclair Pipe Line Co., has been transferred from Gainesville to Whiteboro, Tex.

**V. L. Smith,** field superintendent for Sunray Oil Corp. at Wewoka, Okla., has been transferred to Oklahoma City and promoted to assistant superintendent for Oklahoma.

**Carl L. Tillstrom,** formerly engineer for Phillips Oil Co. at Sweeny, Tex., has joined Lion Oil Co. in the same capacity at El Dorado, Ark.

**Harold M. Trimble,** associate director of research in the research and development department of Phillips Petroleum Co., has been reappointed to the subcommittee on aircraft fuels of the National Advisory Committee for Aeronautics.

**W. H. Gettys,** corrosion crew chief for Phillips Petroleum Co., has been promoted to corrosion engineer at Bartlesville, Okla.

**O. I. Jantz,** party chief for Amerada Petroleum Co. at Columbia, La., has been transferred to Cleveland, Tex.

**Burl Wingrove,** geologist for Reno Oil Co., has been transferred from Wichita Falls to Monahans, Tex.

**Ray M. Thompson,** formerly division geologist for British-American Oil Producing Co., has joined Hiawatha Oil & Gas Co. as exploration manager at the new district offices opened at Denver. **Charles Severy,** formerly with The California Co., will be division geologist at the new headquarters.

**Reynolds V. Gordon,** engineer for Amerada Petroleum Corp. at Seminole, Tex., has been transferred to Bunkie, La., in the same capacity.

**Leldon M. Harris,** associate engineer for Humble Oil & Refining Co. at Conroe, Tex., has been transferred to Hardin, Tex.

**Carl B. Rush,** junior petroleum engineer for Stanolind Oil & Gas Co., has been transferred from Alvin to Beaumont, Tex.

# DEATHS

**Daniel T. Pierce,** 76, for 21 years assistant to the president of Sinclair Oil Corp., died February 16 in New York City. Pierce was the constant adviser and traveling companion of H. F. Sinclair until Sinclair's retirement from active association with the company about 2 years ago. Since then Pierce served as executive assistant to P. C. Spencer, present head of Sinclair. Prior to joining Sinclair, he was for 25 years a public-relations adviser.

**William S. Calcott,** 59, special assistant to the director of the technical section of E. I. du Pont de Nemours & Co.'s organic chemicals department, died February 15 in Philadelphia. Among the many research investigations carried out under his direction were those on the development of methods of analysis for organic mixtures and on the development of a process for the manufacture of tetraethyl lead.

**Morris E. Leeds,** 82, founder and chairman of the board of Leeds & Northrup Co., died recently at Lake Wales, Fla.

**Joseph S. Stein,** for many years general superintendent of Kirby Petroleum Co., died recently in Corsicana, Tex. Stein had retired about a year ago.

**R. L. Rea,** 47, widely known independent oil operator of Centralia, Ill., died there February 16.

**Fred Arrington,** 67, an oil man since Spindletop, died recently at Rogers, Ark. He was a pioneer rotary contractor in the Southwest.

**Maurice E. Mennecier,** 50, development project engineer for Schlumberger Well Surveying Corp., died recently in Houston.

**H. L. Mathers,** 72, pioneer oil man and one of Oklahoma's early drilling contractors, died February 14 in Tulsa.

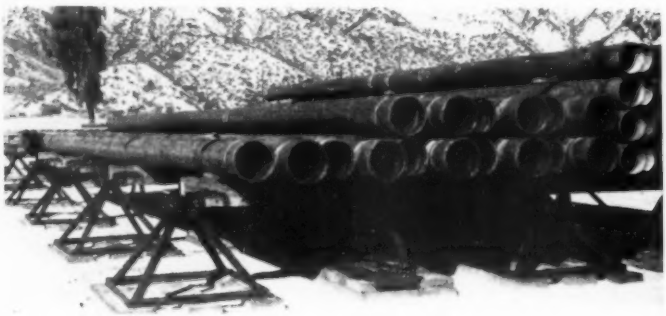
**Evan D. Jennings,** 75, pioneer Pennsylvania oil producer, died February 17 at Pittsburgh.

**James W. Long,** medical director of Gulf Oil Corp., died February 17 in Pittsburgh.

**Fred Harvey McCosh,** 61, of Wilshire Oil Co., Huntington Beach, Calif., died there recently.

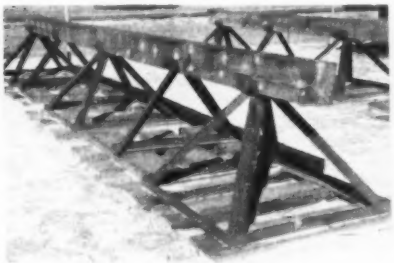
**Harry Pulaski,** 66, oil man and coowner of Pulaski Iron & Metal Co., died February 19 at Houston.

**Edward MacTaggart,** 80, oil producer, died recently at Marietta, Ohio.



# Humble's Casing Rack

**Rack at Humble Oil & Refining Co.'s Castaic storage yard in southern California, where casing is placed for convenience of loading. This rack, like all units in the storage yard, can be moved at will to any location.**

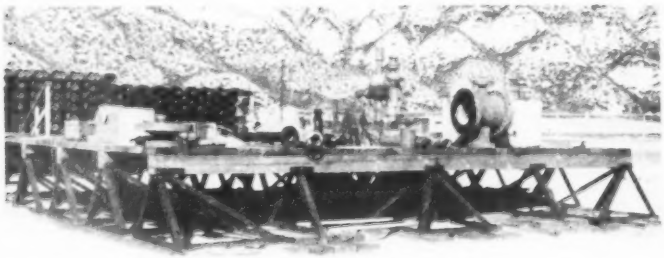


## 1. Pier Details

**This pier increases capacity of storage of casing and tubing.**

## 2. Extra Units

**Pile of extra end supports, showing identical construction.**



# Humble's Tool Rack

**This tool dock has steel supports similar to those under pipe piers. It can be moved easily to any location without disruption.**

HUMBLE OIL & REFINING CO. has designed its storage yard in the Castaic area of southern California so that all of the equipment going into its construction, such as pipe racks and tool docks, can be salvaged 100 per cent.

Humble entered the Castaic area by obtaining production on Newhall Land & Farming Co. properties near the Santa Clara River.

The company designed the yard on this basis, so that the entire layout can be moved at will. The complete assembly can be reerected at another location without cutting any of the steel members or repouring concrete.

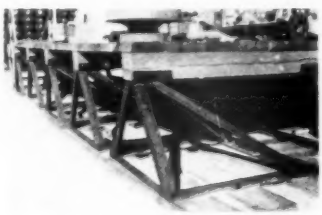
**Details.**—Sills for the rack on which the pipe, casing, and tubing are placed are made out of conventional 8 by 10-in. undressed oil-field timbers. These horizontal sills are supported by steel members which elevate their tops to the usual height common to most pipe racks. The members supporting the sills are in pairs, with each individual sill being identical to the other, and therefore interchangeable.

Supports, which are used at the ends of the sill timbers and where two sills join at the ends, are made as pyramids, with flat tops. Sill retainers are welded to these tops. Bases of the pyramidal supports are about 50 in. square, and the four corner standards are about 40 in. long. Both the base and standards are made of 3-in. angle iron.

**Bases.**—The bases are made with the inside angle placed so as to receive the diagonal corner standards with their ends in each corner, where they are welded. The other supporting member, also made of 3-in. angle iron, is in the form of a simple "A" frame having two diagonals and one base. The top of this unit is cut so a timber saddle is welded to the top into which the 8 by 10's are set.

The saddles on top of both types of supports are identical, having two holes bored through both sides for bolts to retain the timbers in place when the rack is built. Foundation for a rack section requires fourteen or fifteen 2 by 12's about 5 ft. long, which are laid directly upon the grade.

Each pyramidal support is set on three such timbers, while the "A" frame type requires only two timbers on the ground. However, it also requires two or three additional planks laid crosswise, as the over-all height



# End Supports

**Variation of pyramidal supports for pipe piers. Identical bases with A-frame risers are backed up with 45° sloping braces.**

of the A-frame sections is approximately 2 in. less than the pyramidal type.

Since the saddles are approximately 10 in. long, and containing two bolt holes, the length of the sills of a given rack's section may be extended indefinitely by placing matching ends of two sill timbers upon one of the pyramidal supports, then continuing with an A-frame and another pyramid.

To build one section of the pipe rack requires three pyramidal supports and two of the A-frame type. Extending the length one-half requires only one A frame and another of the pyramids, since the joint between two sills comes in the saddle of one of the pyramids where bolts are used to prevent misalignment and separation.

**Tool dock.**—The tool dock requires a combination of A frames and pyramids together with a variation of the pyramid as supports for the ends of the sills so as to clear this area to enable a truck to drive alongside.

When a tool dock is made which requires two timbers for a single sill, the center support is one of the standard pyramids, and the intermediate A frames. Each end support has the same size base as the pyramids, and is made of 3-in. angle iron.

**NEAT AND COMPACT.—This combination generator room and tool house on Santa Fe Drilling Co.'s rig eliminates "excess baggage," is easy to transport from location to location.**

## Generator Room

### Unit for Santa Fe's rigs can be transported easily

A COMBINATION generator room and tool house designed by Santa Fe Drilling Co., Santa Fe Springs, Calif., for use with its drilling rigs eliminates "excess baggage" and simplifies moving from location to location.

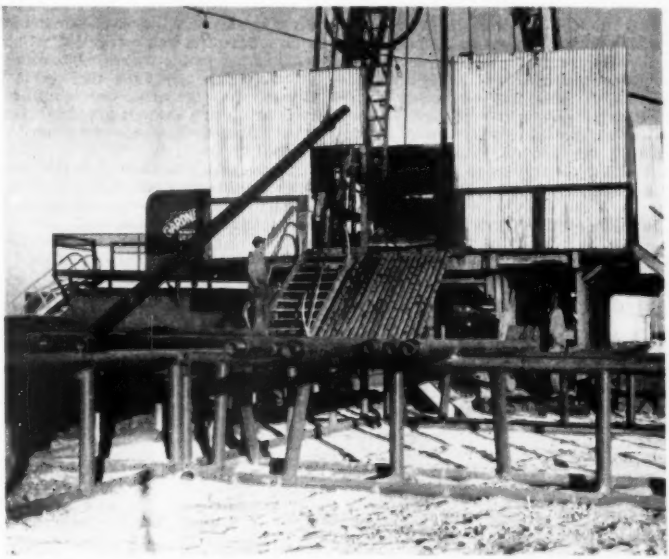
The building is made of tank steel and structural shapes. On common sills the walls rise to top plates which contain cross-members supporting a flat steel roof. Structural shapes used are substantial enough that men can walk safely on the roof while bringing material to the rig floor from the ground.

A steel partition isolates the tool room at one end of the building from the larger area, which is occupied by the generators. The tool room contains bins, drawers, and shelves arranged in a handy way for replacement parts and small tools. By having all fittings and tools in separate bins, the job of sorting out what is needed is greatly simplified.

**Generator section.**—Inside the main section, the generator engines are located with exhaust pipes running through openings at one end so that all fumes are vented to the air. While the tool-room end of the building is designed to fit against the derrick substructure, and is vertical with no extensions, generator has diagonal braces to strengthen it as the greatest load is made up here.

Large doors on supporting rollers provide wide openings on each side of the generator section. The tool-room side has a standard hinged door.

Lifting of the entire unit is accomplished by placing hooks of a crane sling into lugs at each of the top four corners. Building and contents can be moved without disconnecting or disassembly.



## Old Drill Pipe Used for Racks, Ramps

**Dan Kirkland, tool pusher in the Abilene, Tex., area for Gardner Bros. Drilling Co., Dallas, has made good use of old drill pipe for pipe racks, runway support, and derrick ramp. Rig shown is on the Odom lease of Humble Oil & Refining Co., Fort Chadbourne field, Runnels County. In the right foreground, A-frames for pipe racks were made of 4-in. pipe, as were the box-frames supporting the 3 by 12's on the runway floor. Three-inch pipe was used for the derrick ramp. All cutting and welding was done in the field.**

# Thermal Operators . . . Take Intensive Training . . .

WHEN Cities Service Oil Co. was installing its new 8,350 bbl. per day Orthoflow cat cracker at its Ponca City, Okla., refinery, one of the big questions was: "Just how can we best train our thermal cracking operators to take over efficiently the operation of the new facility?"

The answer proved to be a carefully planned training program developed, in cooperation with plant superintendent S. H. McMurry and other Cities Service management, by Ervan Crewse, cracking-department supervisor, and Louis G. Brannin, assistant cracking supervisor in charge of the cat cracker.

**Problem.** — The Orthoflow unit designed by M. W. Kellogg Co. is the first of its kind in the United States. The other cat cracker of this type presently in operation was placed on stream by British American Oil Co., Ltd., at Edmonton, Alta., only 7 months ago.

To insure smooth initial start-up the Cities Service supervisors planned a practical training program, which was set up, in the following manner:

Training began with the thermal cracker shift foremen, who would be responsible for the cat cracker operation.. Step-by-step, the program included:

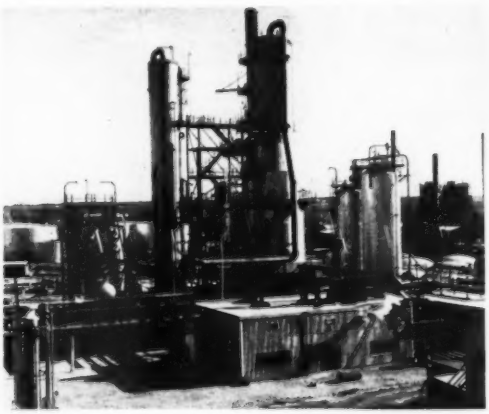
1. Intensive blackboard instruction, with the process first discussed in the over-all sense to serve as background for what was to follow.

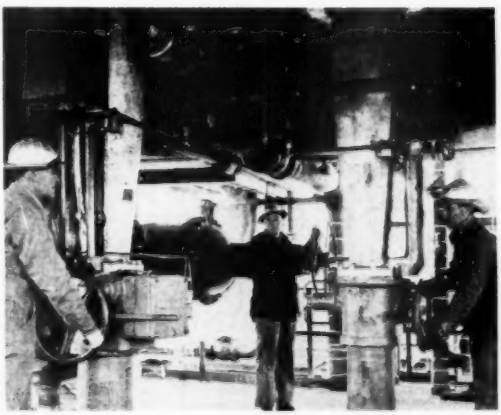
2. Study of the simplified flow diagram. Foremen were given a sheet of paper and asked to draw the flow sheet. This was repeated several times, with the additional of successively more detail. Principal vessels and major lines were drawn first, then auxiliary equipment added.

3. Study of the main cat fractionator and gas plant. Reflux and products drawoff trays were drawn in, and flow to and from the fractionator discussed.

4. Instrumentation, often difficult to put over, was tackled next. Controls on the Orthoflow converter were taken up one by one. "Why is the control set up in this particular manner?" "What is the logic behind it?" Brannin asked the questions in order to make the foremen think

# To Run New Cat Cracker . . . Safely, Efficiently





## ← In the Photos

**(Upper left) Cracking-department foremen at the Ponca City, Okla., refinery of Cities Service Oil Co. are left to right, Paul Ringgold, Glenn Boxley, John Radcliff, Walter McDonald and Frank Bogle. (Upper right) Louis G. Brannin, assistant cracking-department supervisor, is pointing out some features of the main cat fractionator to James Sugg, Van Meadows, Russell Wallace, Lacy Fleenor, Glen Kizer, Claude Phipps, Harold Berrigan, and James Baker. (Lower left) The new Orthoflow catalytic cracking facilities. (Lower right) Ed Bennett, left, and Harold Berrigan, right, are operating the plug valves on the riser and standpipe. In center, Glen Kizer opens valve on air line to regenerator.**

along with him to see how the instrumentation worked in with the process.

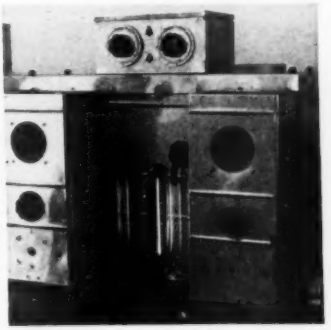
**On the unit.** — During the second phase of training, the shift foremen got a change of pace by going out to work on the unit itself, applying some of the things learned off the blackboard. Principal flow sheets from the operating manual were put into a notebook which the men could carry around easily. With these to help them, they set to work tracing out lines and checking actual operation of the Orthoflow cat and associated units.

**Stepdown technique.** — While shift foremen were working on the cat unit stillmen were undergoing the same intensive instruction in the classroom. By the time the stillmen were ready to work on the unit, the foremen felt pretty much like cat cracking veterans and were able to take the stillmen in hand and guide them over the rough spots.

This stepdown technique was followed with the first and second helpers. Here the instruction was not in quite so much detail, but the foremen benefited by acting as full-scale instructors for the helpers.

**Refinery trips.** — Along with classroom and on-the-unit work at Ponca City, trips were made to other refineries. In June, while the Orthoflow unit was still under construction, Crewse and Brannin visited the Cities Service refinery at East Chicago, Ind., to observe the turnaround and start-up of the "standard" design Kellogg fluid unit in operation there.

They next went to Edmonton for a first-hand look at British American's 3,000 bbl. Orthoflow installation. Operation of Deep Rock Oil Corp.'s fluid unit at Cushing, Okla., and the cat cracker of National Cooperative Refinery Association at McPherson, Kans., was also observed.



**CONTROLS arrangement on Engler distillation unit.**

## Replacement Frequency Cut By Rearranging Controls

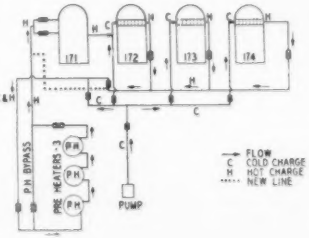
Replacement frequency of controls has been cut down considerably by construction of a specially designed box for protecting rheostat mechanisms on electrically operated Engler distillation apparatus in the laboratory of Sinclair Refining Co., Houston.

Previously the controllers would burn out every 4 to 6 weeks due to shorts in the heating elements or from oil falling down on them as a result of flask breakage. Further damage would be done to the controls in those instances when foam was required to quench a blaze.

The rheostat controls were removed from their position underneath the heaters and installed in a separate cabinet above the condenser box. A further safeguard was carried out by adding fuses to the internal wiring of the heaters and their controls. This consists of fusing one side of the feeder line ahead of the rheostat and both leads to the heater element.

## Bypassing Hot Oil Charge Increases Preheat to Still

To cut out live steam preheaters and raise the effective capacity of a still battery, Humble Oil & Refining Co. used a 6-in. bypass jumpover from a hot charge line.




Hot charge from dome preheat sections of Stills 172, 173, and 174 were bypassed around the live steam preheaters to increase the preheat to Still 171 (see drawing). In this manner the capacity of the battery was raised since the effective mean temperature difference between live steam and cold charge in the preheaters was increased to a greater extent than the reduction of the over-all heat transfer coefficient caused by reduced preheater throughput.

## Extra Seal Provides an Effective Packing for Pumps

In order to prevent compound from leaking on methyl chloride pumps operating with shafts in a vertical position, Humble Oil & Refining Co. installed a second seal to the conventional single seal and packing in the stuffingbox.

Not only was compound loss put to an end, but the new method saved the downtime previously consumed in attempts to improve the packing arrangement on the pumps.

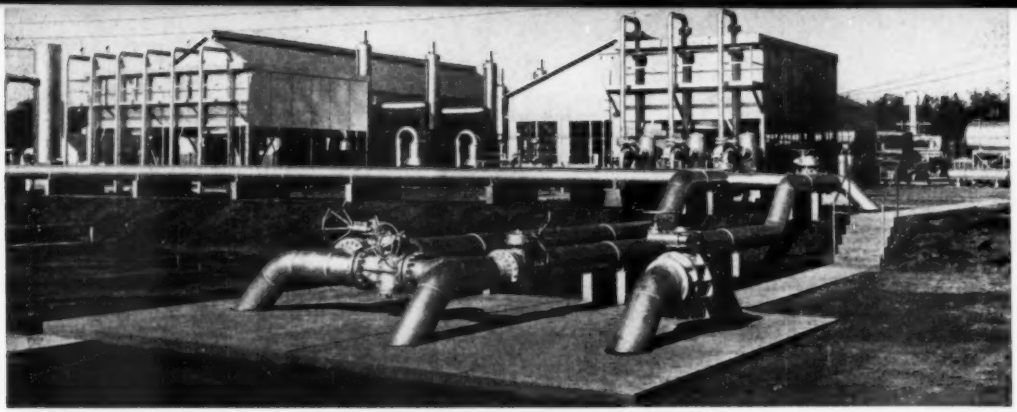
The stuffingbox was bored out to permit inclusion of the Duraseal inside the box, and a gland fabricated for installation at the bottom of the stuffingbox to seat the carbon ring against which the seal would operate.

The stuffingbox was also counterbored for a water jacket, and inlet and outlet holes for cooling water were drilled on the gland.

The stuffingbox has a ½-in. nipple on both sides between the seal which can be used on a seal-oil system.

## Big Refinery Flange

**An example of the size of flanges now required in modern refineries is this one, which Nancy Yakovatz, warehouse clerk at Cities Service Oil Co.'s East Chicago, Ind., plant, displays. The welding-neck flange measures 47½ in. outside, and weighs 944 lb.**



Compressor station at left background houses four 1,000-hp. compressor units with a combined capacity of 160 million cubic feet per day. Auxiliary room at right contains the electric generating station.

# Depew, Okla., Project Can Store Up to 40 Billion Cubic Feet of Gas

## Southwest's largest and deepest underground storage can handle 200 million cubic feet daily

**by Joseph A. Kornfeld**
Mid-Continent District Editor

RECENT completion of the Depew underground gas-storage project of Oklahoma Natural Gas Co. in East Central Oklahoma marks the largest and deepest individual project of its kind in the Southwest. Representing an investment of more than $2,000,000, the installation marks the largest of the three underground storage units operated by Oklahoma Natural in this area. The new Depew project and others, Osage and Haskell, are identified in Fig. 1.

The large size of the Depew gas reservoir—55 billion cubic feet—dwarfs the combined size of the remaining storage installations. Depew alone will permit the return of as much as 40 billion cubic feet above "cushion" or permanent inventory volume. It will step up the system's maximum contemplated storage volume from 5 billion to 45 billion cubic feet.

The present gas-gathering and gas-dehydration systems are designed to process 200 million cubic feet per day; these systems may be expanded easily. Currently, as much as 103 million cubic feet of gas is being processed daily. The present group of eight injection and withdrawal wells have an absolute open flow at 1,000 psig. of approximately 1.25 billion cubic feet per day.

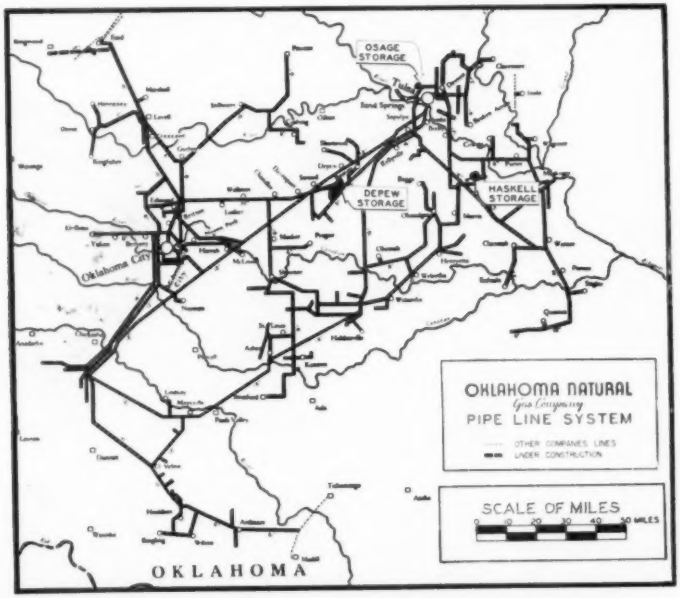



Fig. 1—Map of pipe-line system of Oklahoma Natural Gas Co.

### Role of Storage

The principal purposes of underground storage are:

1. To provide a market for summertime distress gas.
2. To furnish an additional supply for peak load requirements.
3. To furnish an emergency gas supply.

These storage projects are usually located near market centers where they can be readily drawn upon to supply a high percentage of any peak-day requirements. And the underground gas-storage projects conserve gas reserves. They afford a relatively steady market to the gas-well producers during the summer months of low market. In addition, the projects offer a market for a

high percentage of residue gas produced from gasoline plants. Thus Oklahoma Natural Gas Co. today purchases 85 per cent of its supply in the form of residue gas from these plants.

A large part of Oklahoma Natural's gas originates as oil-well gas. Principal source is from oil and gas fields in western and South Central Oklahoma. Residue gas from the West Edmond plants is transported eastward through O.N.G.'s 26-in. line to the Depew plant.

### Storage Background

As mentioned, Oklahoma Natural today operates three underground-storage projects in eastern Oklahoma: Osage, Haskell, and its new Depew project.

Here are details of the three gas-storage operations. See Table 1.

**Osage project.** — Oklahoma Natural completed its first conversion of a gas field to underground storage early in 1943. The firm selected the abandoned Osage gas field located 1½ miles northwest of Tulsa (which city is one of its principal markets).

The field was originally produced from 1922 to 1928 by O.N.G. from a 1,600-ft. Burgess sand reservoir covering 1,920 acres. The project, which originally contained nearly 3 billion cubic feet, has supplied more than a billion cubic feet of gas during a single season.

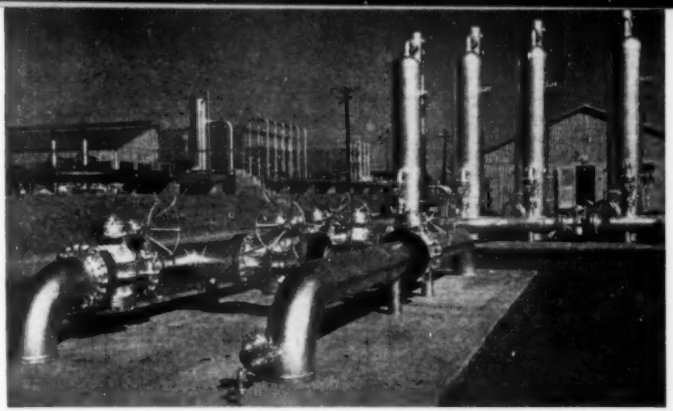
Osage storage has received nearly 11 billion cubic feet to November 1, 1951, and to that date more than 8 billion cubic feet had been withdrawn from storage. Osage has contributed as much as 17 per cent of the peak-day load of the system (March 10, 1948).

**Haskell project.**—Second of the three underground gas-storage projects converted by the firm is the Haskell reservoir. It is located 30 miles south of Tulsa and 19 miles from Muskogee. The 7,000-acre field lies at a depth of 800 ft. and produces from the Booch sand. The field was discovered back in 1914 and was converted to storage in 1944. It contains originally nearly 11 billion cubic feet.

Haskell storage has received nearly 26 billion cubic feet of gas to November 1, 1951; as of that date more than 15 billion cubic feet has been withdrawn. In a single season, it has furnished nearly 4 billion cubic feet to the system. This reservoir has delivered as much as 13 per cent of the peak-day requirements of the system (on January 25, 1949).

**Depew's position.**—In the spring of 1950, Oklahoma Natural converted the third of its fast-growing network of underground storage projects—Depew. This conversion was made in a 7,360-acre abandoned gas field which lies 50 miles southwest of Tulsa and 80 miles east of Oklahoma City.

The Depew project is ideally located on the main transmission lines of the system to receive residue gas from the western Oklahoma oil and gas fields during the summer injection season, and to supply either Oklahoma City or Tulsa areas during the heavy demand for space heating.



**Plant area view showing manifold arrangement on high-pressure gas lines.**

When the reservoir is completely restored to its original pressure of 1,480 psig. more than 40 billion cubic feet of gas per year can be stored in a single season. However, Oklahoma Natural plans to cycle currently approximately 14 billion cubic feet of gas per year for present requirements.

During the past injection season, more than 11 billion cubic feet was injected during a 7-month injection period. Well-head pressures at the end of the season rose to a maximum of nearly 800 psig. This volume is more than twice the combined net injection volumes stored at Osage and Haskell combined during 1951.

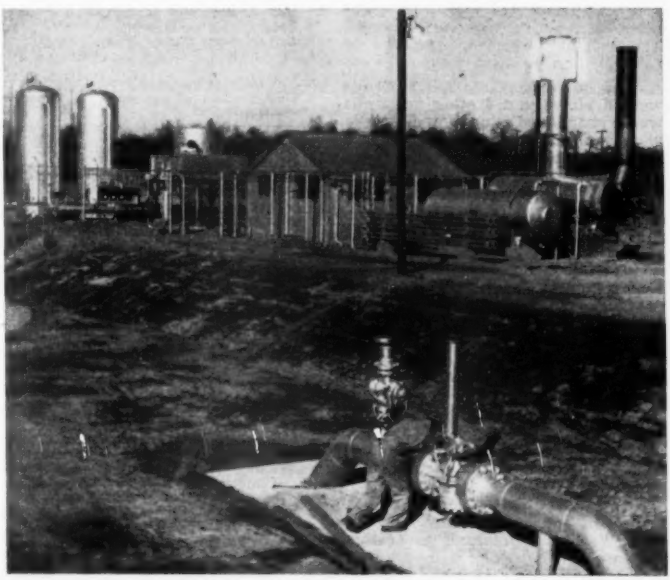
Magnitude of the new Depew project as compared with the remaining storage projects of the firm is shown in Table 2.

### Main Gas Sand Reservoir

**Dutcher sand.**—The Dutcher sand (Pennsylvanian), in the area leased for storage, occurs at a depth of about 3,250 ft. The structure is a closed anticline including portions of Sections 25 and 36 in Township 15n-7e, and Sections 30 and 31 in Township 15n-8e. Productive relief of the structure is 90 ft.

A contour map prepared from driller's logs of wells in the area showed the highest part of the Dutcher sand structure to lie in the SE¼ 25-15n-7e, and in the NE¼ 36-15n-7e.

**Original development.** — The field was discovered during 1922. Initial



**Over-all view of the triethylene glycol unit which dehydrates the gas as it leaves the underground storage reservoir.**

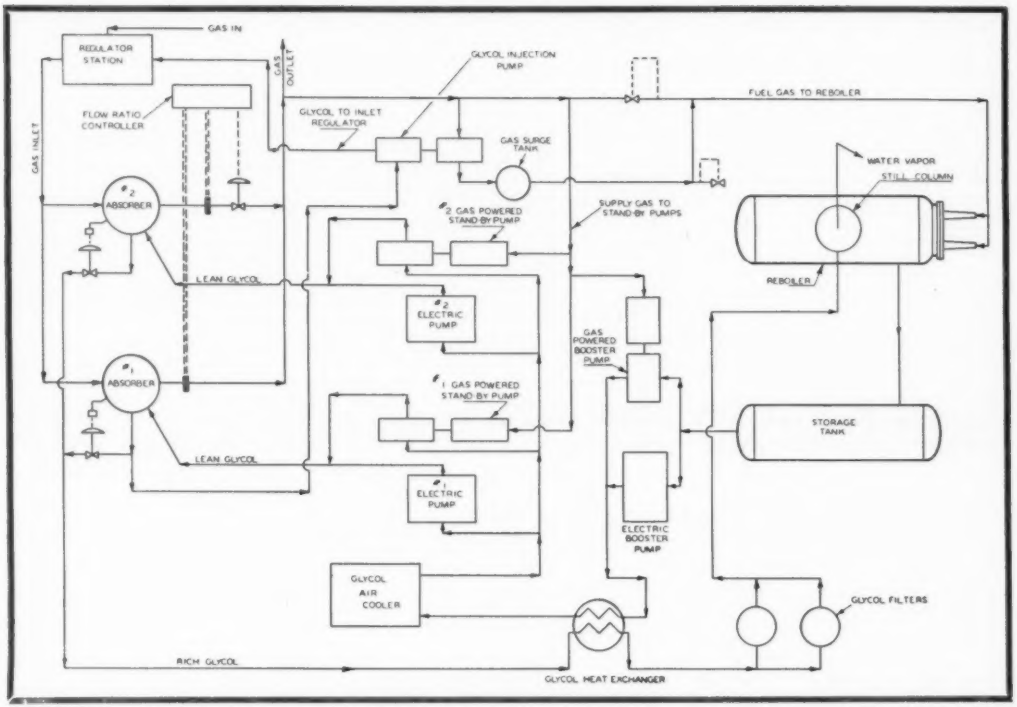



**Fig. 2—Flow sheet of the triethylene glycol dehydration unit installed at Depew. Design capacity is 200 million standard cubic feet at 400 psig. and 75° F.**

open-flow volumes ranged up to 56,000 M.c.f. per day. By the spring of 1928, original field development had been completed to outline a gas reservoir covering 7,360 surface acres. The original reservoir pressure is calculated to be 1,480 psig.

Prior to conversion, 20 gas wells were depleted and 6 other gas wells were abandoned due to excessive water encroachment; then only 6 gas wells remained in the field. Since conversion, seven new facility wells have been drilled and one well recompleted.

### Injection History

Gas injection was initiated at Depew on May 6, 1950. Limited withdrawals were made during the winter of 1950-1951 (from October 25, 1950, to February 15, 1951). Average well-head pressure was 470 psig. as of the former date. First full injection season covering the period from April through October 1951 when 11.3 billion cubic feet was injected; injection rate over this 7-month period averaged 54 million cubic feet daily.

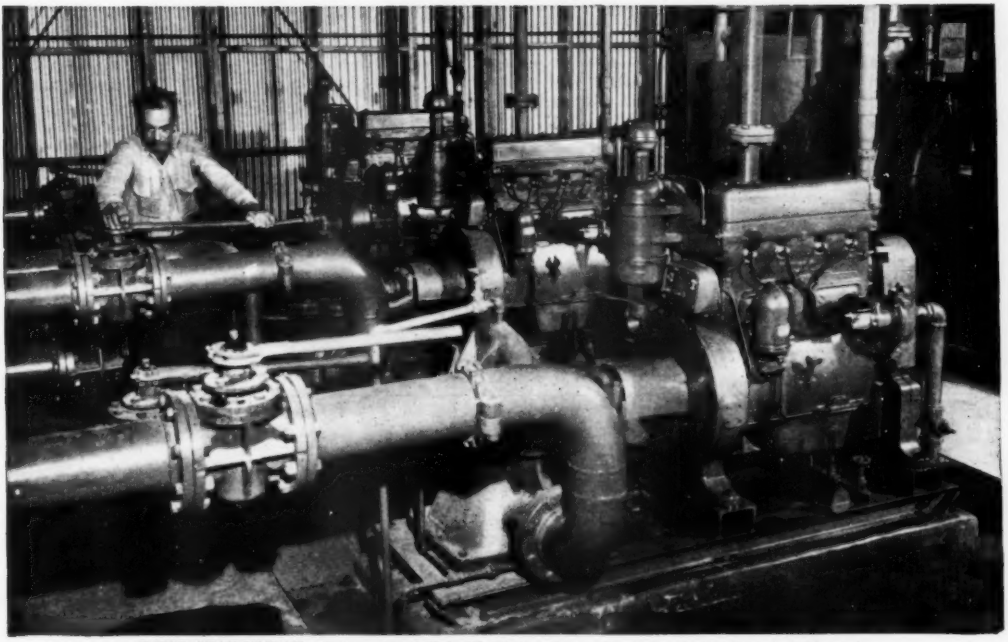
Nearly 22 billion cubic feet of gas had been injected to November 1, 1951. Well-head pressures as of this date average 790 psig.; with addition of the 128-lb. weight of the 3,250-ft. gas column, the average reservoir pressure was 1,352 psig. Withdrawals

**TABLE 1—RESERVOIR PERFORMANCE AND VOLUME DATA—UNDERGROUND GAS-STORAGE PROJECTS OPERATED BY OKLAHOMA NATURAL GAS CO.**
(All volumes measured at 14.65 psig.)

| Item— | Depew | Haskell | Osage |
|---|---|---|---|
| 1. Year of discovery of storage sand | 1922 | 1914 | 1922 |
| 2. Date of first gas injection | May 6, 1950 | June 12, 1944 | April 21, 1943 |
| 3. Storage surface area, acres | 7,360 | 7,000 | 1,920 |
| 4. Structure | Closed anticline | Closed anticline | Closed anticline |
| 5. Lithology of gas sand | Sandstone | Sandstone | Sandstone |
| 6. Geologic age of gas sand (in Pennsylvanian series) | Dutcher | Booch | Burgess |
| Performance data— | | | |
| 7. Average depth to gas sand, ft. | 3,250 | 800 | 1,600 |
| 8. Original reservoir pressure, psig. | 1,480 | 325 | 565 |
| 9. Average volume produced per pound drop in pressure during original producing life of field; M.c.f./lb. | 36,950 | 33,580 | 4,830 |
| 10. Average volume injected per pound rise in pressure during first injection period, M.c.f./lb. | 23,825 | 30,176 | 5,850 |
| 11. Average volume withdrawn per pound drop in pressure during withdrawal period following first injection period, M.c.f./lb. | (*) | 19,000 | 4,830 |
| Volume data: (thousands of cubic feet)— | | | |
| 12. Estimated original gas content (from original to zero pressure) | 54,680,000 | 10,900,000 | 2,730,000 |
| 13. Maximum anticipated volume to be stored in reservoir | 54,680,000 | 10,900,000 | 2,730,000 |
| 14. Total gas volumes withdrawn prior to conversion to storage | 52,300,000 | 10,570,000 | 2,670,000 |
| 15. Total gas volumes injected since conversion (to Nov. 1, 1951) | 21,982,367 | 25,567,747 | 10,821,348 |
| 16. Total gas volumes withdrawn since conversion (to Nov. 1, 1951) | 817,348 | 15,161,579 | 8,425,068 |
| 17. Maximum contemplated volume storing at end of injection season (storage volume available for injection and withdrawal) | 40,000,000 | 3,500,000 | 1,500,000 |
| 18. Maximum net volume withdrawn during any single withdrawal season | (*) | 3,359,114 | 1,153,465 |
| 19. Maximum net volume injected during any single injection season (injection minus withdrawals during injection season) | †11,315,379 | ‡3,767,603 | §1,152,986 |

*Only minor withdrawals to date. †April through October 1951. ‡March through November 1945. §April through October 1943.

# HIGH RECOVERY
## LOW COST



**THREE-STAR LINE-UP**—International U-9s lift 1500 gallons of water per minute against 18 p.s.i. pressure to top of cooling tower and circulate cooling water through two 300-hp. gas compressor units.

**Economical International power provides cooling for compressed casing head gas pressure recovery system in California field.**

Casing head gas fed back into the wells produces phenomenally high oil recovery for the Brea Canyon Oil Company, Brea, California. The compressed gas, fed back into 40 wells at 550 pounds pressure, pushes out the oil. The gas is used over and over again in a closed system.

Three International U-9s power the circulating water pumps in this casing head gas compressor station. Two of the three International pumping units are always in operation, with the third on stand-by duty. Because cooling this system is vital, these Internationals *have to deliver*. And they do—take it from Superintendent Boyd and Foreman Cole:

"We're very happy with the service and performance we get from them. They run 24 hours daily. Yet on monthly checks to examine spark plugs, adjust ignition and inspect engines, usually nothing more than an occasional fan belt replacement is necessary."

See your International Industrial Distributor, Power Unit Dealer or oil field supply house. Get the facts on how International power will produce high recovery at low cost for you.

**INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.**

**INTERNATIONAL** INTERNATIONAL HARVESTER **POWER THAT PAYS**

since conversion of this project to storage have been only 817,348 M.c.f. of gas.

**Performance data.**—Reservoir performance of the Depew project since conversion has been quite satisfactory. During the original producing life of the field, average volume produced was 36,950 M.c.f. per pound drop in well-head pressure. Performance history for the 7-month period from April 1, 1951, to November 1, 1951, averaged 23,825 M.c.f. per pound. Since the first injection season of mid-1951, the total gas withdrawals have not been sufficient to ascertain the magnitude of the M.c.f. per pound figure for this Dutcher sand reservoir.

### Drilling of Input Wells

A sufficient number of input wells, in addition to those gas wells converted to injection, is necessary in any underground storage project to obtain the high deliverabilities required for peak day or emergency supply requirements.

Since conversion, the firm has drilled seven new input wells. These were drilled by contractors using rotary-drill rig.

**Casing program.**—Standard casing program for input wells employed at Depew was as follows:

| Size and wt.— | Setting depth (ft.) | Amount of cement (sacks) |
|---|---|---|
| 10¾-in. | 130 | 125 |
| 7-in., 20-lb. | 3,240 | 950 |

**Drilling procedures.**—A 13⅜-in. surface hole is cut to a depth of about 145 ft. The 10¾-in. surface string is run to this depth and cemented to the surface using 125 sacks of cement.

Following a lapse of 72 hours to permit cement to set, drilling is resumed and the hole is reduced to 9 in. The objective Dutcher gas sand is logged at an average depth of 3,240 ft.

Only 150 hours is required to drill from the grass roots to the top of the Dutcher gas sand. Eleven bits are required. Bit performance ranges widely from 56 to 811 ft. per bit, averaging 292 ft.

Normally a 10-lb. mud with a viscosity of 33 seconds A.P.I. is carried. During the last 700 ft. of hole, the weight of the drilling mud is held at 9.7 lb. and the viscosity at 36 seconds A.P.I.

Rotary method is employed in drilling to the top of the Dutcher sand where the well is standardized. O.N.G.'s drilling department considered cable-tool drilling in necessary at Depew due to the existence of low reservoir pressures as a result of the initial depletion of the gas reserve. After the drill pipe is laid down, an electric log and a caliper survey are conducted.

Operators run about 100 joints of 7-in., J-55, 20-lb. production casing to the top of the Dutcher. Three 7-in. casing centralizers are used. One is mounted on the bottom joint, one at 2,900 ft., and the third at 1,100 ft. Cement shoe and float collar are run and cementing conducted with conventional double-plug method. The slurry is circulated to the top of the casing using 1,200 sacks with 4 per cent Aquagel.

**Drilling in.**—Cable tools are moved in to drill out the cement plug. A pitot tube is run following each 2 ft. of penetration; this is done to ascertain the optimum depth to which penetration of the gas sand should be made.

The following tabulation shows the effect of penetration of the Dutcher gas sand on flow volumes at well No. 2242 at Depew:

| Depth (ft.) | Manometer reading (in.) | Daily gas rate, by pitot tube (M.c.f.) |
|---|---|---|
| 3,221-23 | 0.1 | 380.2 |
| 3,223-25 | 0.2 | 559.4 |
| 3,225-27 | 0.25 | 633.0 |
| 3,227-29 | 0.3 | 684.2 |
| 3,229-33 | 0.6 | 969.8 |
| 3,233-35 | 0.9 | 1,186.9 |
| 3,235-37 | 1.8 | 1,500.0 |
| 3,237-40 | 2.0 | 1,700.0 |
| 3,240-42 | 2.2 | 1,870.0 |
| 3,242-44 | 2.2 | 1,870.0 |
| 3,244-47 | 2.2 | 1,870.0 |

**TABLE 2—COMPARISON OF UNDERGROUND GAS-STORAGE PROJECTS, OKLAHOMA NATURAL GAS CO.**

(Billions of cubic feet at 14.65 psia. and 60° F.)

| Item— | Depew | Haskell | Osage |
|---|---|---|---|
| 1. Original volume of gas in reservoir | 54.7 | 10.9 | 2.73 |
| 2. Gas produced prior to conversion | 52.3 | 10.6 | 2.67 |
| 3. Gas in reservoir prior to conversion | 2.4 | 0.3 | 0.06 |
| 4. Gas stored to reach cushion pressure | 12.3 | 7.1 | 1.17 |
| 5. Gas volumes at cushion pressure | 14.7 | 7.4 | 1.23 |
| 6. Maximum working volume | 40.0 | 3.5 | 1.50 |
| 7. Maximum anticipated volume in reservoir | 54.7 | 10.9 | 2.73 |
| 8. Ratio of maximum working volume to maximum anticipated reservoir volume | 0.73 | 0.32 | 0.56 |

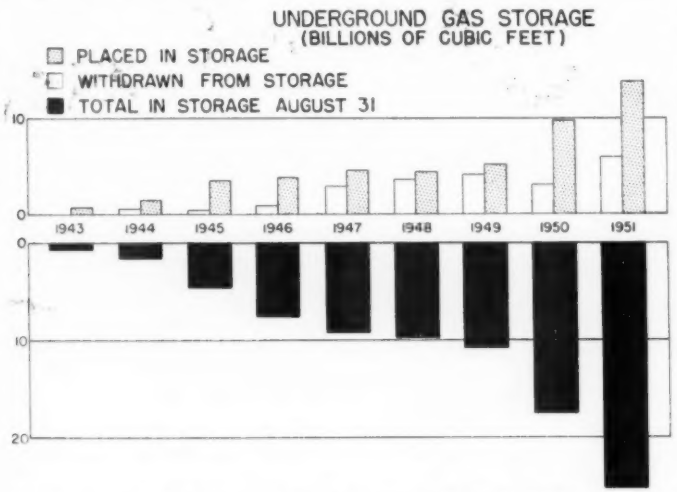



**Fig. 3—Growth of underground gas-storage operations of Oklahoma Natural Gas Co. by years from 1943 to 1951, inclusive.**

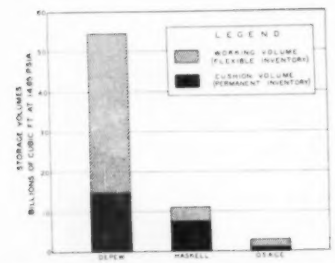



**Fig. 4—Comparison of cushion volumes and working volume capacities at Depew, Haskell, and Osage.**

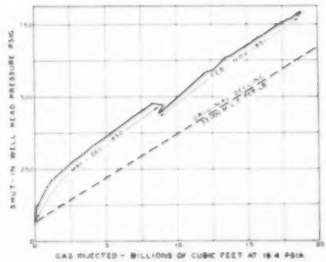
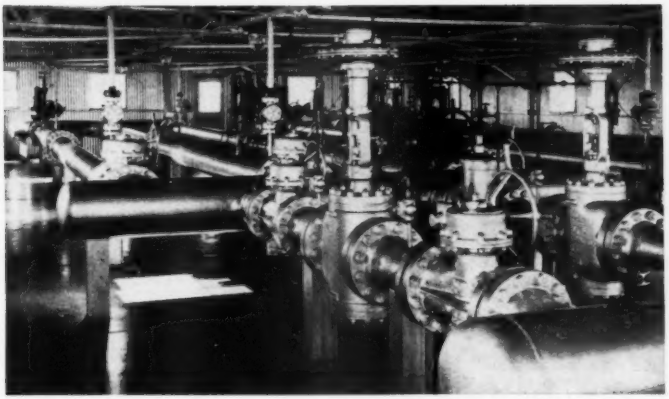



**Fig. 5—Pressure-volume performance curve for Depew storage from May 6, 1950, to November 5, 1951.**



**Interior view of gas-metering station at Depew storage project.**

**Completion.**—A string of 104 joints of 2½-in. upset tubing is run to 3,244 ft. A tubing perforator is run to 3,238 ft. A 2,000-lb.-w.-p. christmas tree is installed, flow lines and meter run installed for completion.

Initial flow tests are conducted through the tubing. Then a tubing gage is mounted on the top of the tree to permit continuous check on the static tubing pressure. All input and withdrawal operations are then conducted through the casing.

**Replugging program.** — One of the major problems encountered in the preparation of the Depew field for underground gas storage is related to the replugging of old former producers in the Dutcher (Pennsylvanian) sands or the Wilcox (Ordovician) sands. The following procedure was employed:

1. Determine the location of the old well and move in rotary tools.

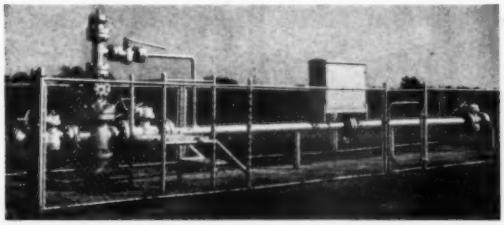
2. Set 400 to 600 ft. of 8⅝-in. casing and circulate cement to surface (usually requiring 700 to 1,450 sacks of cement). In the event that cement does not circulate to surface a temperature survey is made, the surface pipe is perforated immediately above the cement level outside the pipe, and cement is squeezed to the surface. The cement is allowed to set for 24 hours before operations continue.

3. A blowout preventer is installed and the old hole is redrilled to the original total depth. If the old well was a Dutcher well positive identification of the formation is made by drilling enough additional footage to return a sand sample. This additional footage usually amounts to 10 ft.

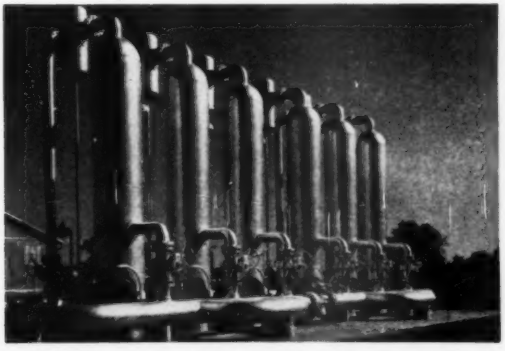
4. If the well was a Dutcher completion and the original long string of casing was cemented when the well was first drilled, the present replugging method calls for placing a cement plug from the bottom of the hole to approximately 100 ft. above the top of the sand. The hole is then filled with rotary mud to the bottom of the surface pipe, a cement plug placed at that point, and the remainder of the hole filled with mud.

If the Dutcher well casing was not cemented at the time of original completion, perforations are made in the pipe near or at the sand depth and cement is squeezed behind the pipe. This squeezing is accomplished by employing a "cement" packer; tubing is run to the depth of the perforation holes, cemented in place, and allowed to set. Thus when cement is again squeezed through the tubing it is forced into the Dutcher and behind the pipe rather than returning up the hole.

(Continued on page 175)



**Typical installation of gas input well showing 2,000-lb. w. p. christmas tree and meter run. Eight wells have been completed with a combined open flow of 1.25 billion standard cubic feet per day.**



**View of gas scrubbers installed at Depew storage.**

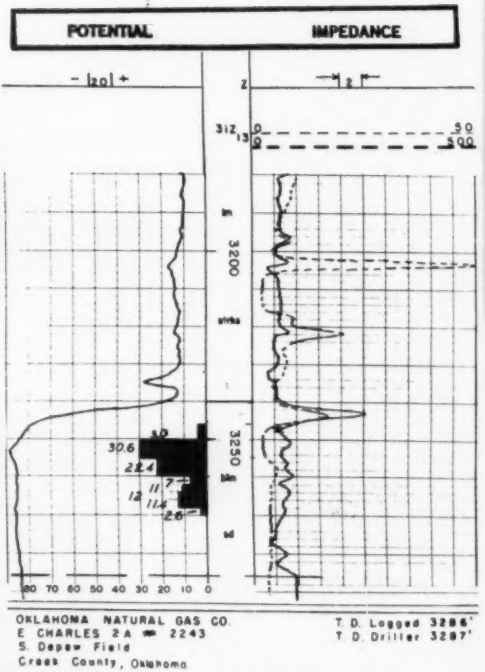
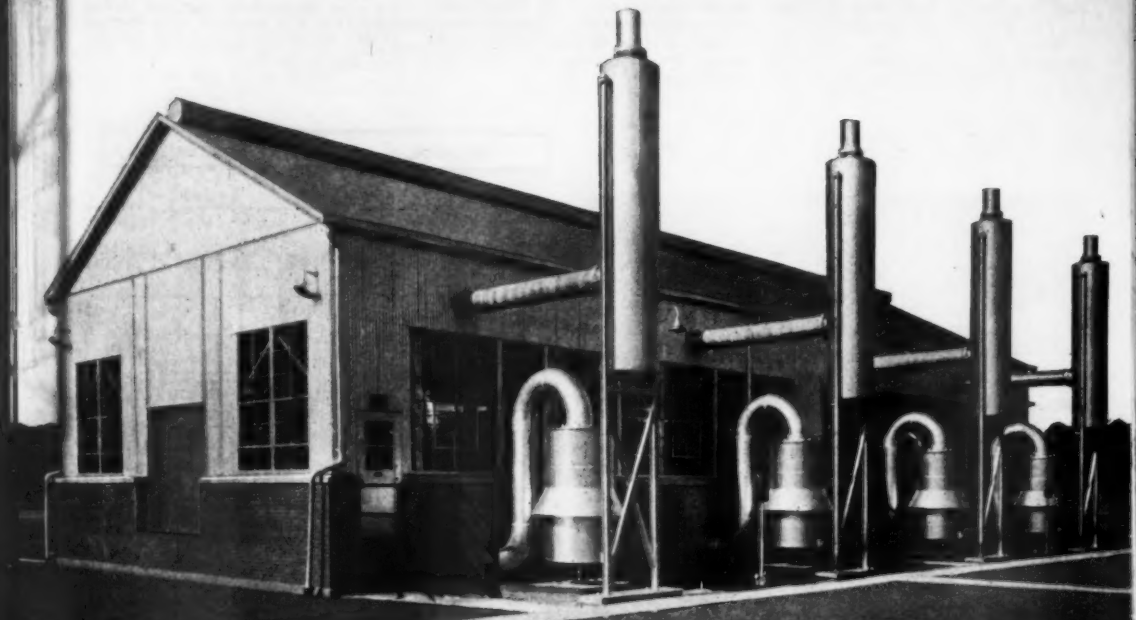



**Fig. 6—Type electric log of Dutcher gas sand pay section detail for Depew storage field. Superimposed on the log is gas volume capacity-distribution curve obtained from Spinner survey; lower scale refers to per cent of capacity.**

# In Oklahoma Natural's largest gas-storage project . . .

## . . . a lot of compressing in small space with compact GMV's



ANGLE

# Compressors

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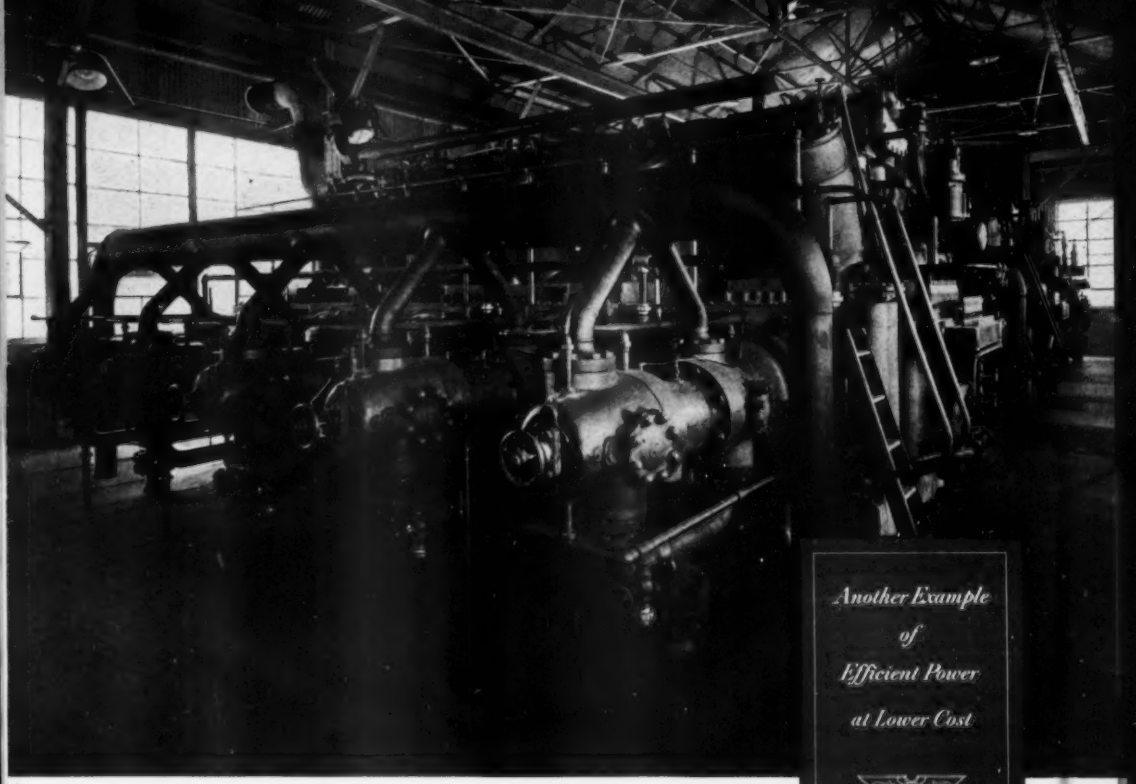

*Another Example of Efficient Power at Lower Cost*

● Look at the size of the building . . . and the neat compactness of this 4400-hp GMV compressor set-up. Here, at Depew, Oklahoma Natural Gas Company is equipped to handle approximately 160,000,000 feet per day with a suction pressure of 500# and a minimum injection pressure of 800# — a lot of compressor work with a minimum of installation and operating overhead.

Note also that these Cooper-Bessemer V-angles are driving 5 compressor cylinders per unit . . . in other words, a compressor cylinder for <u>every</u> crankthrow.

Add up the advantages <u>you</u> stand to gain with Cooper-Bessemer V-angles — proved month-in-month-out availability, unmatched compactness, and over-all operating efficiency that has yet to be equalled! Get <u>all</u> the facts. You'll see why Cooper-Bessemer V-angles are preferred units in <u>every</u> type of heavy-duty compressor service.

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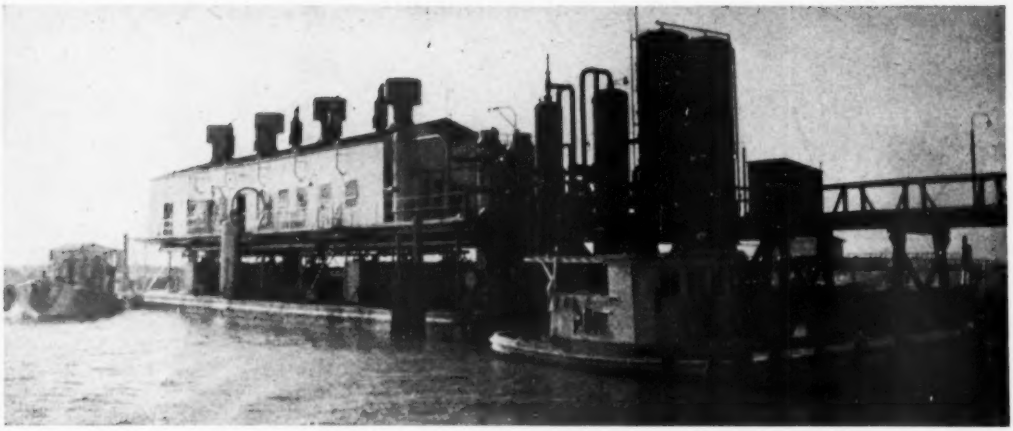


**Fig. 1—One of Gulf Oil's new submersible-type compressor-station barges. Facilities were installed while in dry dock. Barge was then towed to position and sunk to bay bottom.**

# Louisiana Conserving Its Gas Reserves

**by Walter Rose**
Gulf Coast District Editor

**Projects recently completed, nearing completion, or scheduled for later completion in 1952 will do much to eliminate future waste of the state's natural gas**

As demands for natural gas increase and as opportunities for drilling new reserves diminish, there is more and more incentive to develop new and to conserve present supplies. This is especially true in Louisiana, the country's second largest gas-producing state, where, for example, 40 per cent fewer gas well completions were reported in 1951 than in 1950.

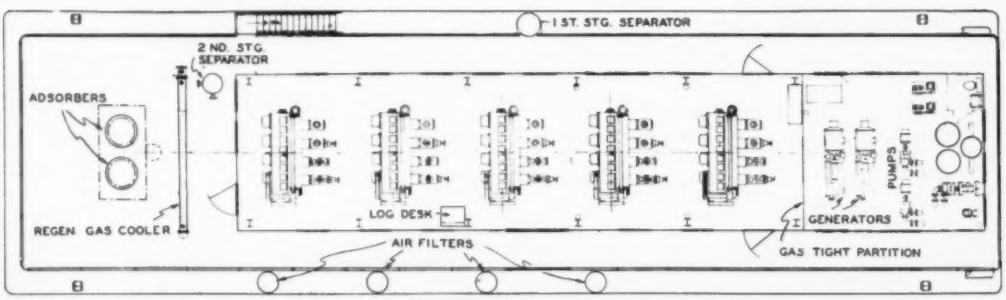
**The gas-flaring picture.**—Texas, the largest gas-producing state, has been able proudly to claim for several years that only a negligible amount of its produced gas is wasted by flaring (about 1 per cent as of the end of 1951). Louisiana, while now flaring more than 5 per cent of production (an estimated 200 million cubic feet daily), is rapidly approaching the point where the level of wasted gas will also be at an irreducible minimum.

This accomplishment in conservation may be credited to the farsightedness of state officials and operating companies in Louisiana who have shown a willingness to invest large sums of money to provide the gathering systems, gas-compressor stations, and pipe lines required to deliver the heretofore flared gas into the gas-consuming areas.

While both Texas and Louisiana reported evaporation and flare losses of about 20 per cent of production in the base year of 1944*, the job in Texas in the intervening years of reducing loss has been simplified by the fact that gas-conservation programs there have had a quick economic payout. In Louisiana, on the other hand, many of the areas, where the gas produced with oil has been flared, are dispersed and isolated in near-inaccessible swamps. Special problems of laying marine gathering lines and offshore gas-compressor stations have been confronted. Hence, conservation progress in Louisiana has been slowed by the need to develop the engineering know-how, and to consider the economics of supply versus demand and investment versus profit.

According to recent official figures

*Authority, U. S. Bureau of Mines.




**General arrangement of submersible barge. (Courtesy of Bethlehem Shipbuilding Division.)**

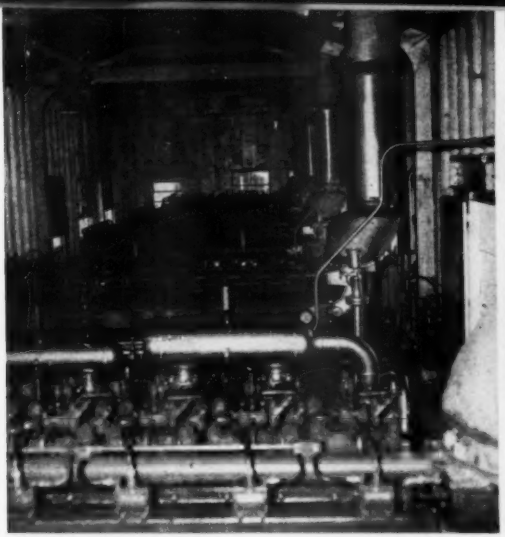


**Fig. 2—Five two-stage 200-hp. compressors, located in the engine room, are fueled by natural gas.**

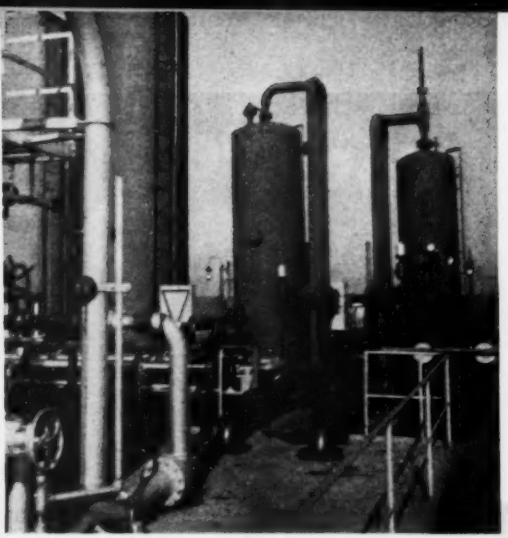


**Fig. 3—Gas from field separators feed through gathering lines into these inlet scrubbers.**

(October 1951), casing-head gas which was metered before flaring stood at 33 M.M.c.f. daily in Texas, and at 12 M.M.c.f. daily in Louisiana. Of course, the volumes of unmetered gas vented on leases can only be estimated, but it is unofficially conceded that these volumes are significantly larger than the above metered flare-gas figures which are reported. In any event, it is probably safe to say that the unofficial estimate of casing-head gas flaring in Louisiana at 200 M.M.c.f. daily is in amount similar to what is being flared in Texas. (Additional volumes, especially in Texas, are being vented in connection with certain gas-processing-plant operations when plant delivery exceeds plant capacity, but this is not a field production problem.) By comparing the total gas-production figures for the two states, it is thus possible to assert that percentage-wise there is a bigger gas-flaring problem in Louisiana than in Texas. October 1951 data had Texas producing about 12,500 M.M.c.f. daily (of which 3,400 M.M.c.f. daily was casing-head gas), and had Louisiana producing about 5,000 M.M.c.f. (of which 1,900 M.M.c.f. was casing-head gas). The high ratio in Louisiana of gas produced from oil wells to gas produced from gas wells makes the gas-flaring record there appear even worse. This latter factor, together with the terrain problem of operating in swamp and marine areas, emphasizes all the more the importance of the progress in gas conservation which Louisiana can now claim.

In spite of growing steel shortages and the tendency of operators at present to divert energies to exploration drilling, officials of the Louisiana Department of Conservation are confident that projects nearing completion and planned for 1952 will achieve the objective of minimizing gas wastage in the future.

**Lower Mississippi Delta region.**—South of New Orleans in Plaquemines Parish are a number of important fields, located in swamp and bay areas, which produce significant amounts of gas along with the oil. For the most part this gas has been flared until recently, because of the lack of gathering-line and pipe-line facilities. The abundance of the oil reserves, which can be produced and removed without undue expense by barge, has for sound economic reasons delayed the exploitation of the gas reserves.

Detailed reference to certain gas-conservation projects recently installed in this area will illustrate nicely the hazards involved, the time and the magnitude of investment required, and the far-reaching importance of these measures which in the end conserve through utilization important gas reserves.

**The Mississippi Delta pipe line.**—Within the last several months, United Gas Pipeline Co. has put into operation a 93-mile line from the lower Mississippi Delta region to its Chalmette station near New Orleans. This 16-in. line which costs an estimated $14,500,000 connects to gas supplies, heretofore flared, at four principal delta fields: namely, Grand Bay, Venice, West Bay, and Quarantine Bay. A connection to Lake Hermitage field is also reported to be under construction.

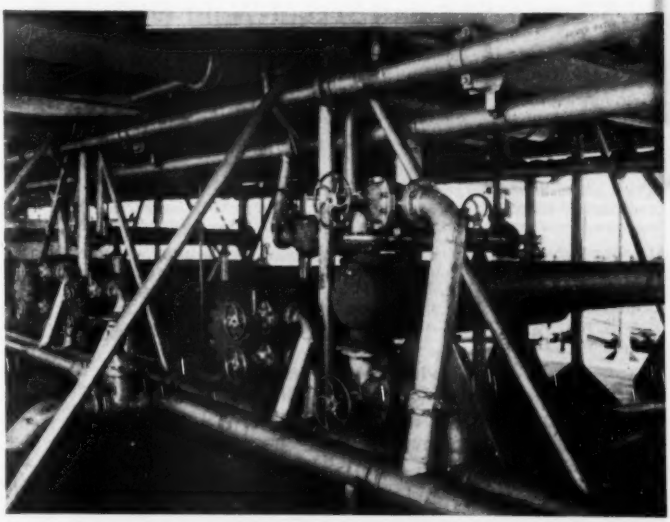


**Fig. 4—Compressor-service heat exchangers, including standby units for use during maintenance, are located on the lower deck.**

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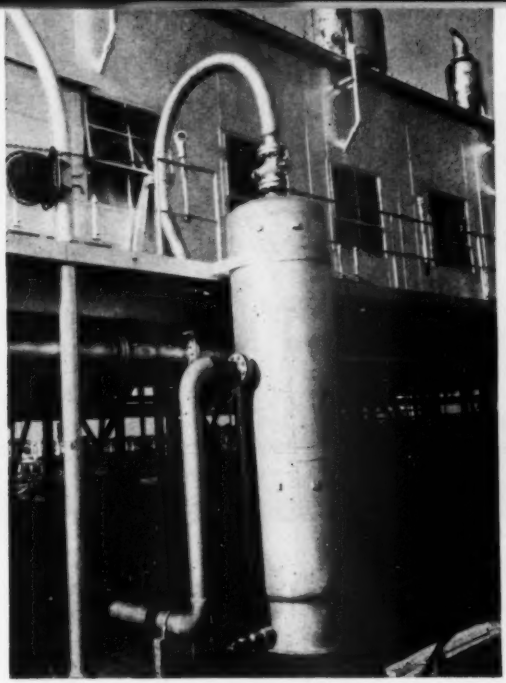


**Fig. 5—Gas from coolers passes through this interstage scrubber on the way to second-stage compression.**

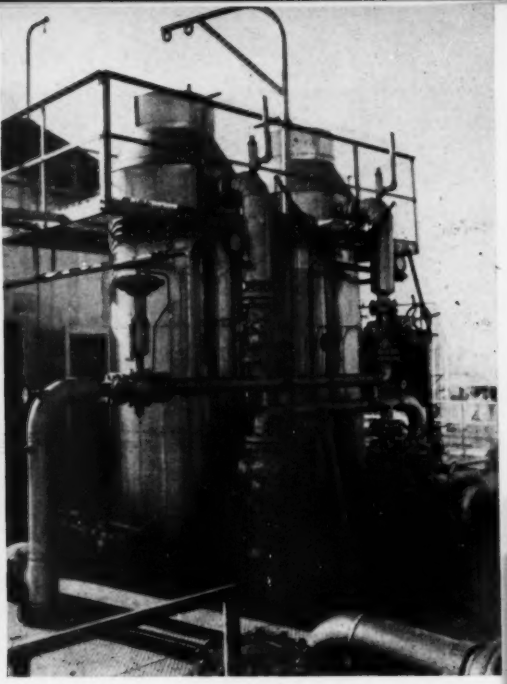


**Fig. 6—Fifteen million cubic feet of gas daily may be processed by two gas dehydrators, utilizing dry desiccant.**

The pipe-line system originates on the east side of the Mississippi River at Grand Bay, and includes among other things the southernmost river crossing on the Mississippi. The latter comprises two 10-in. lines in parallel so that gas transport can continue during temporary shutdown of one of the lines.

In all cases, United's lines extend directly to the compressor stations in each field where the gathering lines terminate. The gathering systems and compressor stations are owned and operated by companies producing from the fields involved, and in effect these operators sell the heretofore flared gas to United at these points. United in turn transports the purchased gas to the New Orleans market. Interestingly enough, gas presently delivered into United's new line, reported in excess of 50 million cubic feet daily, is capable of supplying the new market demand in the New Orleans area occasioned by increased fuel requirements of the expanding aluminum industry.

The ultimate payout of United's investment in the 93-mile pipe line is assured by the magnitude of the gas reserves in the delta fields. Purchase of these reserves is guaranteed to United by long-term contract. An even more rapid payout to the operators of these fields who have invested in the gathering systems and compressor stations can be illustrated by reference to certain gas-conservation projects recently installed by Gulf Oil Corp. in its delta fields.

**Gulf projects.**—This company has major interests in Grand Bay, West Bay, and Quarantine Bay fields located in the more or less protected marsh waters or in the more or less unprotected bay waters of the lower delta region. These fields are approached only by boat or seaplane.

While Gulf is now producing here some 30,000 bbl. of oil daily along with some 30 million cubic feet of gas, other operators produce important additional quantities. These other operators include Tide Water Associated Oil Co., Humble Oil & Refining Co., and The Texas Co., which are cooperating with Gulf, operator of the gas projects in Grand Bay, West Bay, and Quarantine Bay fields.

As long ago as 2 years, Gulf and its partners began giving attention to ways and means of saving flared gas in these fields. They therefore started construction of gathering systems and contracted for the installation of compressor stations, timing the completion of these facilities with the completion of United's pipe line to New Orleans.

**Gas-compressor stations.**—It is evident that no set pattern can be followed in the installation of the required gas-handling facilities, but that conditions in each field will determine the best course to follow. Thus, in some delta fields operators have installed several compressor stations in a given field to handle gas separated at different pressures. This is the course which The California Co. is employing. Others, such as Tide Water at Venice field, have a single station installed on piling. Gulf, on the other hand, elected to use single stations for each field, constructed on platforms patterned after submersible drilling barges.

The anticipated advantage of using submersible barges was to avoid expense of shipping materials and construction manpower, as would be required if the compressor stations were constructed in place on piling foundations. This advantage was realized by having the compressor-station barges and auxiliary equipment prefabricated in dry dock, the assembled unit then being towed into place for installation. Another advantage of the submersible-type compressor stations which interested Gulf in their use was the fact that subsequent relocation of the stations would be possible at minimum expense.

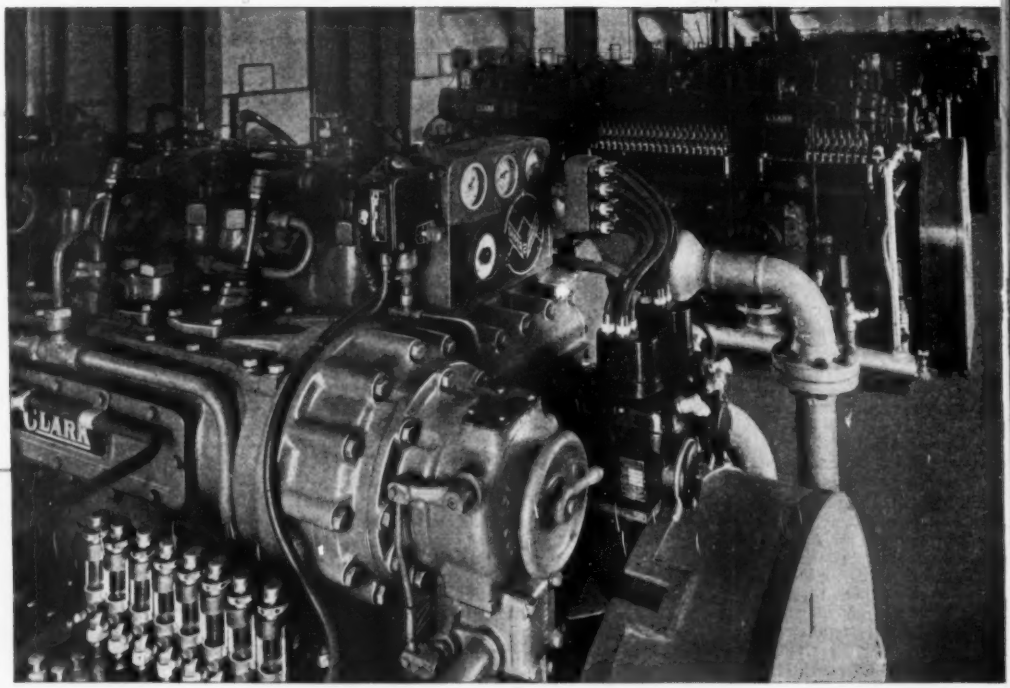
The ease with which the barges can be refloated in an important factor. Moreover, when maintenance is required, the barges can be towed to repair facilities, again avoiding the expense of transporting manpower to field locations. Finally, 100 per cent salvage is a future possibility.

Bethlehem Steel Co., Shipbuilding Division, constructed three submersible barges under contract with Gulf. The prefabrication included installing all compressor-station facilities while the barge was still in dock, so that after the stations were towed from Beaumont to their final locations in Gulf's delta fields, little more than connecting to the gas-gathering lines was required. The barges, one for

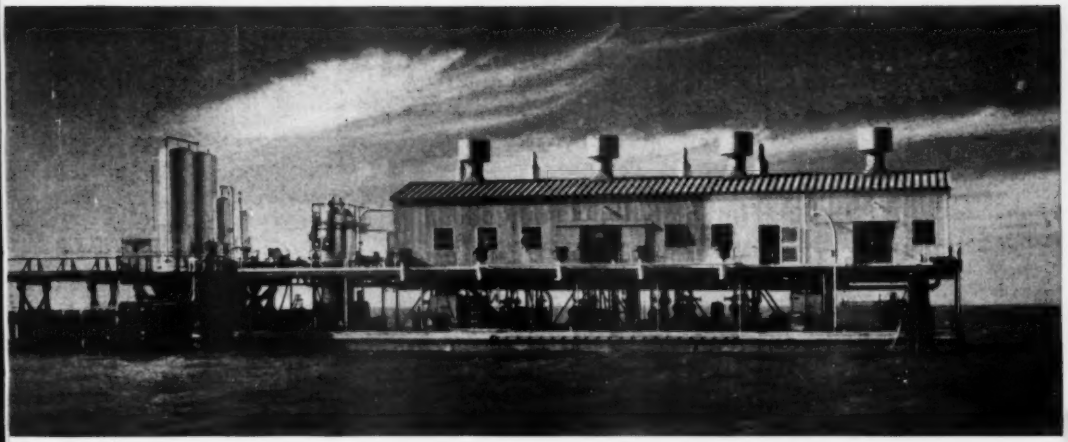
*(Continued on page 175)*

*perfect balance does it!*

# that's how Clark Midget Angles assignment on Gulf




Five Clark Midget Angle, MA-8, 300 bhp, Gas-engine-driven Compressors in new compressor barge operated by Gulf Oil Corporation off coast of Louisiana



# fill this tough Oil's new compressor barge

In Grand Bay, five miles off Louisiana's shores, lies Gulf Oil Corporation's new compressor barge. This floating compressor station, and two others soon to be placed in service, will eliminate gas flaring in five separate Louisiana fields, with the gas being pumped into transmission lines.

The five Clark Midget Angle Compressors aboard represent fulfillment of one of the toughest compressor assignments imaginable. The barge had to be designed to ride out hurricanes, and it was expected that heavy seas would keep its deck awash during these periods of bad weather. This meant that the compressors had to be mounted on steel framework high above deck. The perfect balance of Clark Midget Angles made this feasible and five Clark MA-8, 300 bhp, gas-engine-driven compressors were installed — Gulf Oil's assurance of vibrationless performance.

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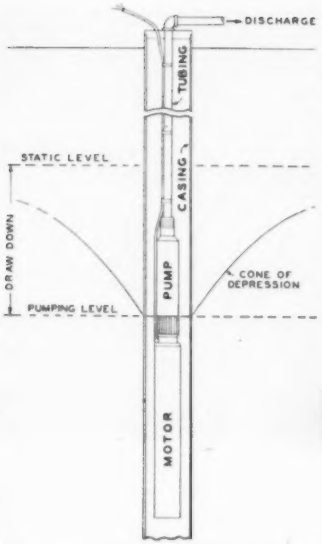



Fig. 1—Schematic arrangement of pumping water well showing relative position of cone of depression.

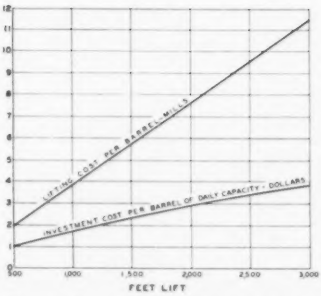



Fig. 2—Approximate investment and per barrel operating cost of pumping installation for various depths.

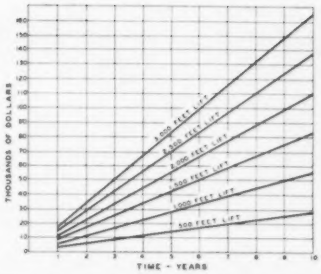



Fig. 3—Cumulative operating costs for 4,000-bbl. pumping units vs. lifts for periods up to 10 years.

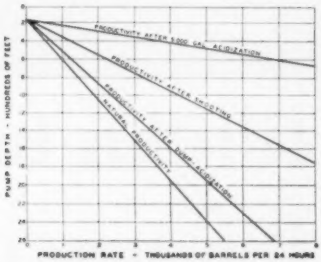



Fig. 4—Actual results of remedial work on a water-supply well in Washington County, Oklahoma.

# DRAWDOWN as a Cost Factor in WATER-SUPPLY WELLS

**"From an economic standpoint, use of acid, shooting, or hydraulic fracturing is highly desirable in almost every well. This practice may result in great savings to the operator, both in investment and lifting cost.**

**"Operators of secondary-recovery or pressure maintenance projects will find that water from wells can be cheaper and more dependable than water from lakes and streams in all but the few areas where surface water is plentiful throughout the year."**

**by Joe Carle***

WHEN a well is pumped, the head of fluid in the well drops from its original or "static" level, and formation pressures are reduced around the well. Distance between the static level and the pumping fluid level is known as "drawdown."

This natural phenomenon of drawdown in a water-supply well may seem insignificant, but it can result in more ultimate operating expense than the entire initial investment in drilling, pipe, and pumping equipment.

Drawdown is the result of friction between water and the reservoir rock, the magnitude of which is determined by the porosity and permeability of the formation and the amount of water being pumped. Friction losses are approximately proportional to the velocity of water moving to the well bore, and therefore result in increased drawdown with increased fluid withdrawal.

Typical conditions in a pumping well where pressure drop is greatest in the well and decreases with distance from the well, gradually diminishing to zero, are illustrated in Fig. 1. The cone or bell-shaped depression thus formed is called the "cone of depression." The size of this cone, or the amount of drawdown, is determined by the permeability and porosity of the formation and by the rate of fluid withdrawal.

Any completion practice that increases relative permeability and porosity of the formation reduces drawdown and therefore reduces size of the cone of depression. In almost all cases cost of such work will be paid out many times during the life of a well. Use of acid, shooting, or hydraulic fracturing is therefore of economic importance in most wells.

### Case Example

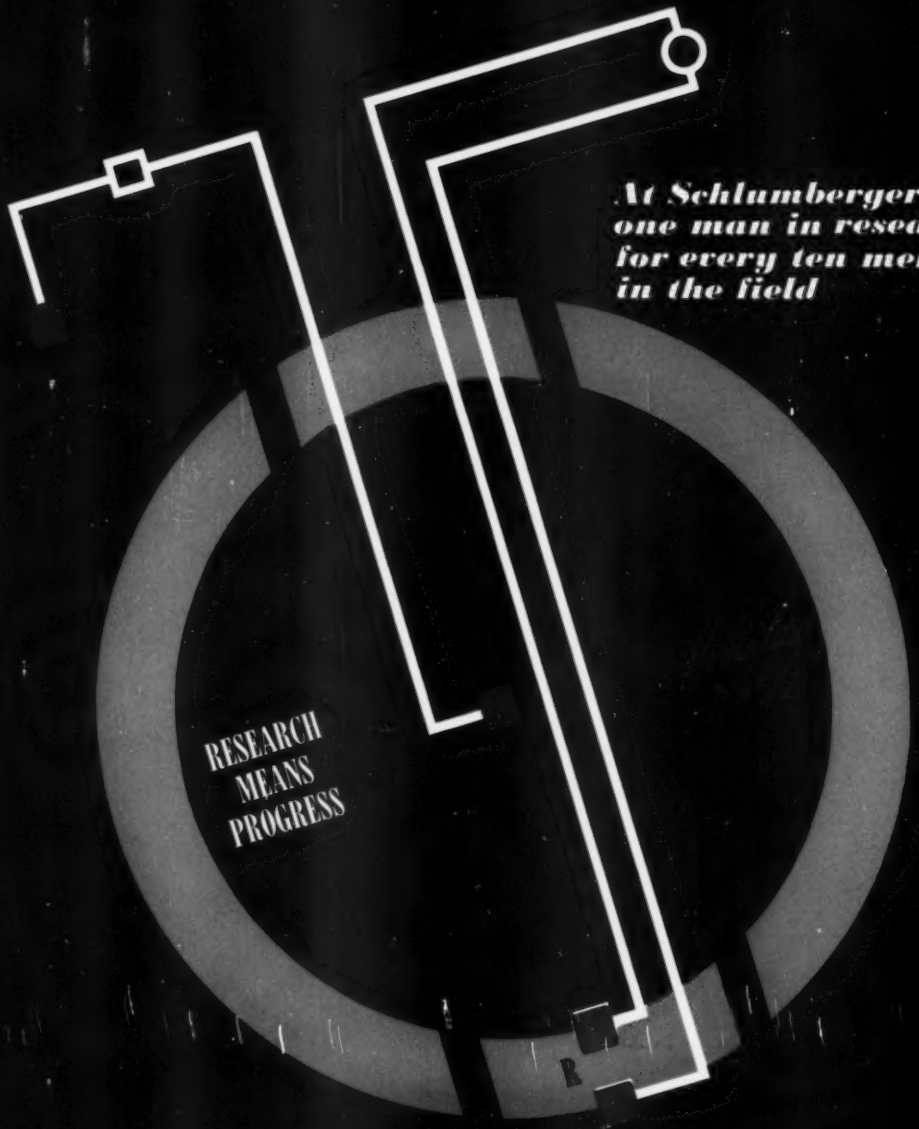
To illustrate the above, a hypothetical well can be considered. This well is drilled to a depth of 3,000 ft. in a limestone formation. Static fluid level is 500 ft. from the top. Casing size is 7 in. o.d. No acid or hydraulic fracturing is performed. Water requirement is 4,000 bbl. per day.

A pump is installed and the well found capable of producing 4,000 bbl. per day, but in so doing, draws down to bottom, a drawdown of 2,500 ft.

Approximate investment and per barrel operating cost of a Reda pumping unit capable of performing this operation are shown in Fig. 2. Investment cost, including tubing, is $3.73 per barrel of daily capacity, a total of $14,920. Lifting cost, based on a power cost of 1 cent per kw.-hr.,

*Reda Pump Co., Bartlesville, Okla. Presented at Kansas-Oklahoma Water Flood Operators meeting.

# SCHLUMBERGER RESEARCH...

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| PROBLEM | GUN USED and CASING SIZES | RESULT |
|---|---|---|
| *1. Dominguez, California. Well used to test results of Glass Jet charge in new size, small O.D. Solid Steel Perforator Body. Shots to be fired in well idle for over 15 years. Well to be abandoned after our tests. | Special small O.D. McCullough Solid Steel Perforator body with Glass Jet charges. Casing sizes: 6⅝" 24 lb. and 8⅝" 36 lb. Formerly shot with competitive perforators without results. | Sixteen shots fired, one at a time. Rise in fluid level stopped test. On pump, well produced 135 B/D! |
| 2. Shreveport, Louisiana. Well had been shot two times with competitive perforators without results. | McCullough Burrless Bullet and McCullough Glass Jet Perforator with Steel Strip Carrier. 24 shots with each. 4½" drill pipe. Sand formation. | After perforating bailer was run and when retrieved it was about ¾ full of oil. Time on job: one hour. |
| 3. Weesatche, Oklahoma. Well only produced 3 B/D. | McCullough Glass Jet Perforator with Steel Strip Carrier. 12 holes shot through 6" casing. Sand formation. | 60 B/D reported by oil operator after perforating. |
| 4. San Angelo, Texas. Drill stem test: 400 feet of free oil. | McCullough Glass Jet Perforator with Steel Strip Carrier. 4¾" open hole. Strawn lime formation. 102 holes shot. | Steady flow of 50 B/D. Time on job: 3 hours. |
| 5. Cyril, Oklahoma. New well. | McCullough Glass Jet Perforator with Steel Strip Carrier. 7" casing. Sand formation. 270 holes shot. | 240 B/D. 12 runs due to broken zones. Time on job: 13 hours. |
| 6. Kettleman Hills, California. New zone. | McCullough Burrless Bullets. 6⅝" casing. 300 holes shot. | 250 B/D, an exceptionally good well for this area. Time on job: 5 hours. |
| 7. Oklahoma Wildcat. New well. | McCullough Glass Jet Perforator with Steel Strip Carrier. 7" 20 lb. casing. Eight zones perforated with a total of 174 holes. | Production of 65 B/D much greater than anticipated. Time on job: 6½ hours. |
| 8. New Iberia, Louisiana. New well. | McCullough Burrless Bullets. 6⅝" 32 lb. casing. Sand formation. 60 holes shot. | Production not released but Engineer reported a very good well. Time on job: 3 hours. |
| 9. Houston, Texas. Salt water in the hole. Competitive tester made three runs but couldn't fire gun. | McCullough Gun Tester with Burrless Bullets. 5½" 17 lb. casing. 96 holes shot as ordered. | Satisfactory test job. |
| 10. Healdton, Oklahoma. Well would not take acid. | McCullough Glass Jet Perforator with Steel Strip Carrier. 5½" 17 lb. casing. 90 holes shot. Sand formation. | 70 B/D. Time on job: 5 hours. |

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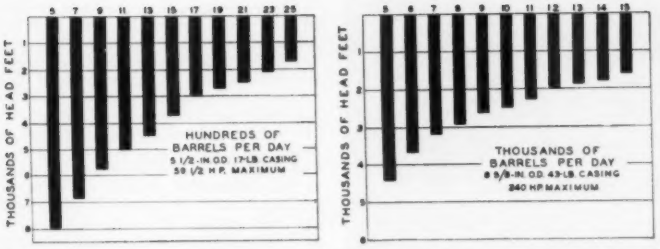
THOUSANDS OF HEAD FEET
HUNDREDS OF BARRELS PER DAY
5 1/2-IN OD 17-LB CASING
50 1/2 H.P. MAXIMUM
THOUSANDS OF HEAD FEET
THOUSANDS OF BARRELS PER DAY
8 5/8-IN OD 43-LB CASING
340 HP MAXIMUM

**Fig. 5—Pumping capacities vs. various lifts for 5½-in. 17-lb., and 8⅝-in. 43-lb. casings.**

and including repairs, transportation, running and pulling, overhead, and amortization, is 11.4 mills per barrel.

It is then decided to acidize the well, the total cost of which, in this hypothetical case, is $3,500. The tested result is a decrease in lift of 500 ft.

Referring again to Fig. 2, the approximate pump-investment cost is $3.23 per barrel, or $12,920, a saving of $2,000. Operating cost is reduced to 9.5 mills per barrel, a saving of 1.9 mills per barrel, or $7.60 per day. Thus after deducting the saving in initial pumping-equipment investment, only $1,500 remains as net cost of acid, and this is paid out in less than 200 days by reduced lifting cost. Assuming a water demand for 5 years at 4,000 bbl. per day, the saving amounts to $12,350.

In most wells, drawdown can be reduced even more than the illustration given here, and resulting savings are proportionately greater. Fig. 3 shows cumulative operating costs for 4,000-bbl. per day pumping units against various lifts for periods up to 10 years. This can be used as a key to determine the economics of proper completion practices if the results can be estimated. Whether the desired daily capacity is much greater or less than 4,000 bbl. daily, the same rule applies. Still another advantage in reduced drawdown is increased well capacity. In this case, reduced drawdown means more daily capacity per well, and fewer wells.

### Specific Case

Choice of the producing formation in which to complete the well should also be given careful consideration. This can best be demonstrated by an actual operation in Central Oklahoma.

Requiring a large amount of water for a water flood of substantial size, the operator drilled five wells to a sand at 1,600 ft. Maximum capacity of each well was about 800 bbl. per day, and the total cost about $20,000 each, including pumping equipment. The combined capacity of these wells, 4,000 bbl. per day, was still far short of the required volume of water.

It was then decided to drill a well to the Arbuckle lime, at a depth of about 5,500 ft. This was done at a cost of $85,000, including pumping equipment. Casing (9 in.) was set and cemented at 1,700 ft., and 7-in. casing was set from 1,650 ft. to the top of the Arbuckle lime. The well had a static level at about 350 ft. from top, and drew down only to 1,000 ft. at a capacity of almost 12,000 bbl. daily.

To achieve this daily capacity in the 1,600-ft. wells, 15 wells would have been required at a cost of $300,000, and the lift would have been 1,600 ft. instead of the present 1,000 ft. Since the first Arbuckle lime well was completed, two more have been drilled, providing a daily water capacity of about 35,000 bbl. The net saving in cost of water supply wells is a staggering sum of $600,000.

Actual results of remedial work on a water-supply well in Washington County, Oklahoma, are shown in Fig. 4.

**CAN PREVENT ENGINE BREAKDOWN**

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*Fig. 1—New sulfur plant of Shamrock Oil & Gas Co. near Sunray, Tex.*

## ECONOMICS OF

# Sulfur Production From Hydrogen Sulfide

**by A. L. Kohl and E. D. Fox**

"The net cost of producing sulfur in a plant associated with other operations under the conditions assumed in this study varies from approximately $8.42 per ton for a plant capable of producing 20 long tons per day to less than $2 per ton for a 320-ton per day installation."

THE vast amount of publicity which has been given to the present world-wide sulfur shortage has resulted in considerable confusion with regard to the basic economics involved. The over-all shortage picture has been well covered by recent articles in technical news magazines.[1,2] However, there appears to be insufficient published information relative to the economic merits of specific processes used or proposed to alleviate the shortage. It is the purpose of this paper to present economic data on processes for the conversion of hydrogen sulfide to elemental sulfur.

Although only a very small fraction of our sulfur supply is now provided from hydrogen sulfide, this source has a distinct advantage over most other possible secondary sulfur sources in that it produces elemental sulfur. Pyrites, smelter fumes, and spent acid can help alleviate the sulfur shortage by providing sulfur dioxide for direct conversion to sulfuric acid, but normally these are not considered to be important raw materials for elemental sulfur. Although about 85 per cent of the total sulfur produced (either as elemental sulfur, hydrogen sulfide, or sulfur dioxide) goes through the sulfur dioxide stage and then primarily to sulfuric acid, the remaining 15 per cent which is used in the elemental form constitutes a very important portion to the chemical industry. It is quite conceivable that a considerable fraction of this elemental sulfur could ultimately be supplied by conversion from hydrogen sulfide.

The sulfur produced from hydrogen

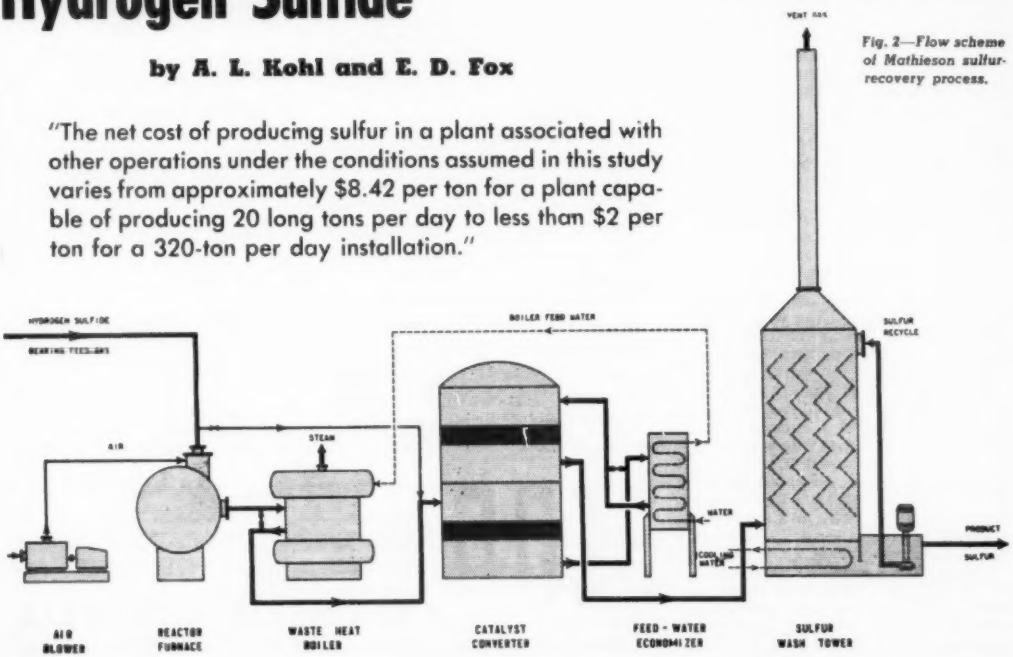
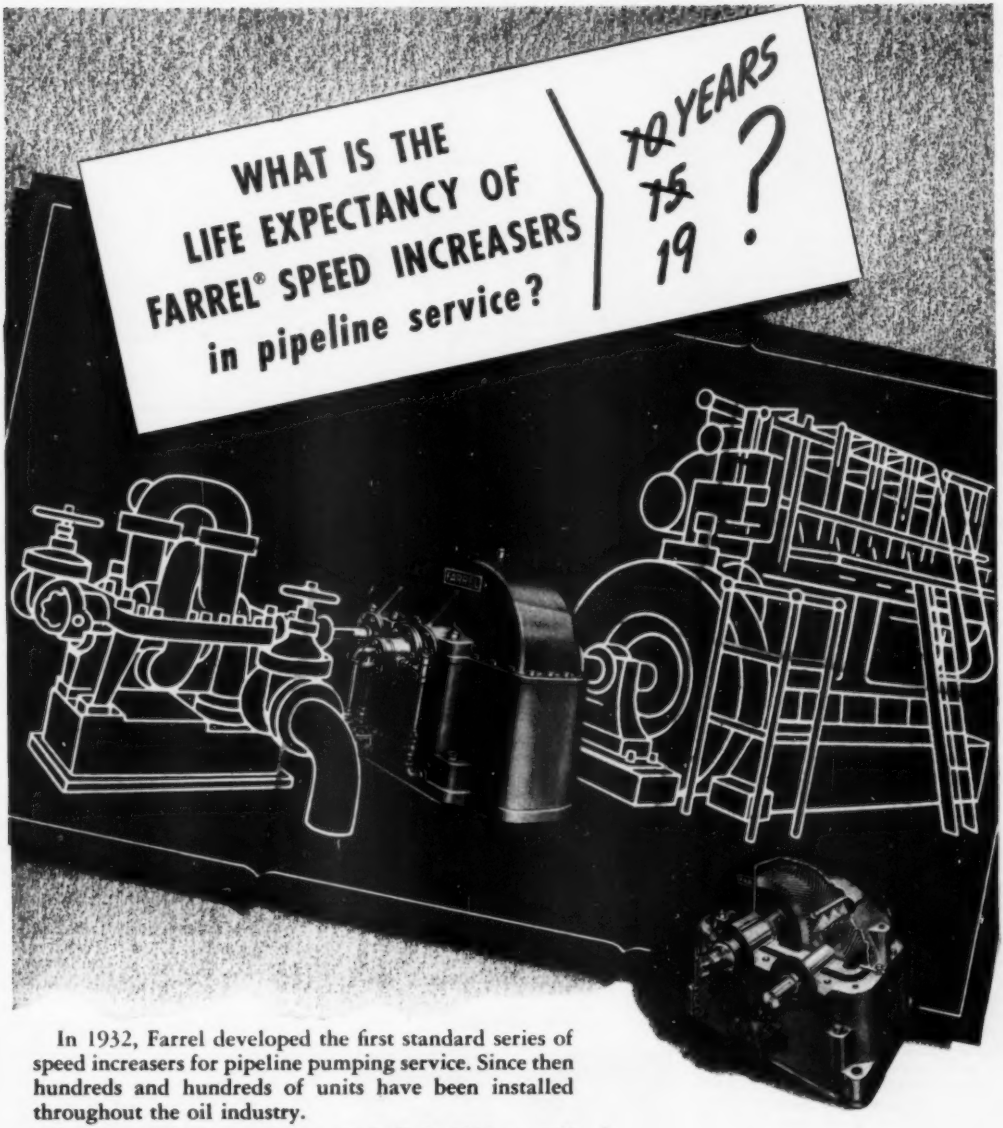



*Fig. 2—Flow scheme of Mathieson sulfur-recovery process.*

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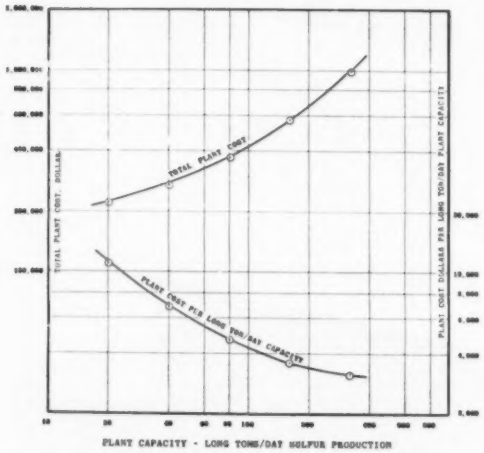


*Fig. 3—Approximate investment cost vs. plant capacity.*

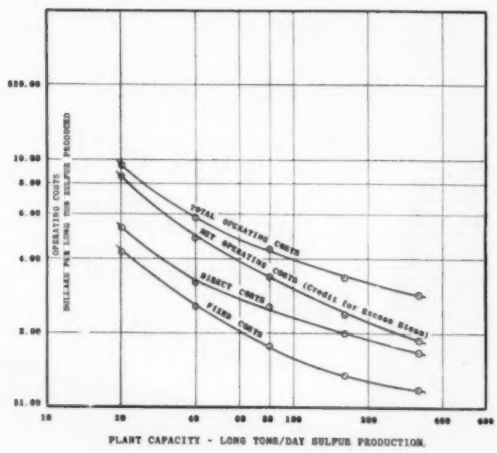
TOTAL OPERATING COSTS
NET OPERATING COSTS (Credit for excess steam)
DIRECT COSTS
FIXED COSTS
PLANT CAPACITY - LONG TONS/DAY SULFUR PRODUCTION

*Fig. 4—Approximate operating cost vs. plant capacity.*

sulfide also has certain advantages over the primary sulfur sources represented by the Frasch process operations near the Gulf Coast. The purity is actually higher, 99.9+ per cent, and combustion yields a negligible ash; furthermore, the widespread geographical distribution of sour oil and gas operations frequently offers substantial marketing advantages to sulfur produced from hydrogen sulfide and in some cases permits the sulfur to be transported in a molten state, eliminating the need for solid sulfur handling and melting equipment.

Principal credit for developing the sulfur from hydrogen sulfide process in this country goes to Southern Acid & Sulfur Co. (now a part of Mathieson Chemical Corp.), which as far back as 1944 operated a plant which converted the hydrogen sulfide vent gas resulting from the operations of McKamie Gas Cleaning Co.[2,3] Their original process was developed on the basis of research and pilot-plant work using the old Claus-Chance process as a starting point. Operations at the McKamie plant proved highly successful, and the same company constructed a second plant which utilized the acid gas flared at Arkansas Fuel Oil Co.'s Columbia plant and in 1946 placed this unit in operation at Magnolia, Ark.

More recently, under the impetus of the impending sulfur shortage as well as the growing concern over atmospheric pollution and the development of new sour oil and gas fields, a considerable number of plants have been constructed for converting hydrogen sulfide to sulfur. Existing installations on this continent are listed in Table I, together with recently announced projects which are still in the planning or construction stages. Fig. 1 is a photograph of the Shamrock Oil & Gas Corp. plant near Sunray, Tex.

## Process Description

The technology of the basic Mathieson process has been very completely described in a recent paper,[5] and will be considered only briefly at this time. Obviously, the plant design can be modified considerably to best fit the conditions of any specific hydrogen sulfide conversion project. However, the flow diagram for a two-catalyst-bed plant using Mathieson Chemical Corp.'s process for the conversion of hydrogen sulfide to elemental sulfur is given in Fig. 2.

The hydrogen sulfide-containing gas is burned in a specially designed reaction furnace with a controlled amount of air, and is then passed through a waste-heat boiler. Under some circumstances as high as two-thirds of the hydrogen sulfide feed is bypassed around the furnace, in which case the stream passing through the furnace is burned all the way to sulfur dioxide. Regardless of the amount bypassed, the quantity of air required is equal to that necessary to convert one-third of the total $H_2S$ to $SO_2$ and $H_2O$, and all of the hydrocarbons passing through the furnace to $CO_2$ and $H_2O$. The over-all reactions with regard to $H_2S$ conversion may be represented by the equations:

$$H_2S + 3/2\ O_2 = SO_2 + H_2O \quad (1)$$

$$2H_2S + SO_2 = 3S + 2H_2O \quad (2)$$

In addition to Reaction 1, some conversion to sulfur may occur in the furnace and side reactions to form COS, and $CS_2$ may also occur to a limited extent.

After passing through the waste-heat boiler, the gas enters the first catalyst bed, in which a major portion of the sulfur is formed. This bed also serves to eliminate undesirable side-reaction products which may be formed in the furnace.

The hot gas from the first catalyst bed is cooled in a boiler feed-water economizer and then passes through a second catalyst bed which is oper-

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**Edward D. Fox is a project engineer for Fluor with whom he has been associated since October 1947. He holds a bachelor's degree in chemical engineering from the University of Southern California, and is a registered professional engineer in California. Before joining Fluor, he spent 6 years as an engineer for the Douglas Aircraft Corp. in Santa Monica, Calif., and 1 year as a production supervisor for the Western-Electro Chemical Co. at Henderson, Nev. At Fluor, his early assignments were concerned with process engineering for gas and gasoline plants and various types of chemical plants. For the past 2 years he has been engaged entirely in process and project work connected with sulfur-recovery plants and is at present a project manager for Fluor in the engineering and construction of sulfur-recovery plants.**

**TABLE 1—HYDROGEN SULFIDE TO SULFUR PLANTS**

| Company and location | Approx. capacity long tons per day product | Year completed |
|---|---|---|
| 1. Mathieson Chemical Corp., McKamie, Ark. | 110 | 1944 |
| Expansion | 60 | 1951 |
| 2. Mathieson Chemical Corp., Magnolia, Ark. | 60 | 1946 |
| 3. Hancock Chemical Co., Los Angeles | 50 | 1948 |
| Expansion | 50 | 1950 |
| 4. Stanolind Oil & Gas Co., Elk Basin, Wyo. | 80 | 1949 |
| 5. Freeport Sulfur Co., Westville, N. J. | 30 | 1950 |
| 6. Texas Gulf Sulfur Co., Worland, Wyo. | 300 | 1950 |
| 7. Petroleos Mexicanos, Poza Rica, Mexico | 120 | 1950 |
| 8. Shamrock Oil & Gas Corp., Sheerin, Tex. | 30 | 1951 |
| 9. Shell Oil Co., Jumping Pound field, Alberta, Canada | 30 | Under const. |
| 10. Phillips Chemical Co., Goldsmith, Tex. | 100 | Under const. |
| 11. Standard Oil Co. (Ind.), Whiting, Ind. | 50 | Under const. |
| 12. Lion Oil Co., El Dorado, Ark. | 10 | Under const. |
| 13. Consolidated Chemical Industries, Inc., Baton Rouge, La. | 30 | Planned |
| 14. Stanolind Oil & Gas Co., Slaughter field, Sundown, Tex. | 50 | Planned |
| 15. Odessa Natural Gasoline and Sid W. Richardson, Inc., Odessa, Tex. | 20 | 1951 |
| 16. Royalite Oil Co., Turner Valley, Alberta, Canada | 30 | Planned |
| 17. Sid W. Richardson, Inc., Keystone, Tex. | 25 | Planned |
| 18. Shell Chemical Co., Houston | 50 | Planned |
| 19. Sinclair Ref. Co., Marcus Hook, Pa. | 20 | Planned |
| 20. Gulf Oil Corp., Port Arthur, Tex. | 50 | Planned |
| 21. Gulf Oil Corp., Waddell, Tex | 20 | Planned |
| 22. Phillips Chemical Co., Crane County, Texas | 50 | Planned |
| 23. Phillips Chemical Co., Eunice, N. M. | 100 | Planned |
| 24. Stanolind Oil & Gas Co., North Cowden, Tex. | 20 | Planned |
| 25. Warren Petroleum Corp., Monument, N. M. | 14 | Planned |
| 26. Atlantic Ref. Co., Philadelphia | 10 | 1936 |
| 27. Atlantic Refining Co., Atreco, Tex. | 16 | Planned |
| 28. Cities Service Ref. Corp., Lake Charles, La. | 20 | In Operation |
| Expansion | 40 | Planned |
| 29. Consolidated Chemical Industries, Inc., Baytown, Tex. | 30 | Planned |
| 30. Davison Chemical Co., Linden, N. J. | 60 | Planned |
| 31. Davison Chemical Co., Baltimore | 25 | Planned |
| 32. Esso Standard Oil Co., Linden, N. J. | 15 | In Operation |
| 33. General Chemical Division, Allied Chemical & Dye Corp, Richmond, Calif. | 50 | In Operation |
| 34. General Chemical Division, Allied Chemical & Dye Corp., El Segundo, Calif. | 75 | In Operation |
| 35. Standard Oil Co. (Ind.), Whiting, Ind. | 55 | Planned |
| 36. Stauffer Chemical Co., Wilmington, Calif. | 30 | In Operation |
| 37. The Texas Co., Port Arthur, Tex. | 25 | Planned |
| 38. Tide Water Associated Oil Co., Avon, Calif. | 30 | Planned |
| 39. Union Oil Co. of Calif., Wilmington, Calif. | 65 | Planned |
| 40. Union Carbide & Carbon Corp., Texas City, Tex. | 15 | In Operation |
| | 2,120 | |

**TABLE 2—TYPICAL SULFUR PLANT INVESTMENT AND OPERATING COSTS[1]**

| PLANT SIZE: | | | | | |
|---|---|---|---|---|---|
| Capacity, long tons per day | 20 | 40 | 80 | 160 | 320 |
| Production, long tons per year[2] | 6,570 | 13,140 | 26,300 | 52,600 | 105,200 |
| INVESTMENT: | | | | | |
| Plant cost | $220,000 | $270,000 | $370,000 | $570,000 | $1,000,000 |
| Working capital, 15 per cent | 33,000 | 41,000 | 56,000 | 86,000 | 150,000 |
| Total investment | $253,000 | $311,000 | $426,000 | $656,000 | $1,150,000 |
| OPERATING COSTS: | —Dollars per long ton sulfur produced— | | | | |
| Depreciation, 10 per cent of cost | 3.35 | 2.05 | 1.41 | 1.08 | 0.95 |
| Taxes and insurance, 2.5 per cent | 0.81 | 0.51 | 0.35 | 0.27 | 0.24 |
| Total fixed costs | 4.19 | 2.56 | 1.76 | 1.35 | 1.19 |
| Operating labor[3] | 1.56 | 0.88 | 0.88 | 0.54 | 0.45 |
| Supervision and clerical[4] | 1.24 | 0.62 | 0.32 | 0.32 | 0.16 |
| Maintenance[5] | 1.34 | 0.92 | 0.56 | 0.43 | 0.38 |
| Supplies, est. | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 |
| Payroll overhead[6] | 0.52 | 0.29 | 0.22 | 0.16 | 0.12 |
| Water[7] | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 |
| Power and fuel[8] | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Total direct costs | 5.23 | 3.18 | 2.55 | 2.02 | 1.68 |
| Total cost at plant | 9.42 | 5.74 | 4.31 | 3.37 | 2.87 |
| Credit for steam[9] | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Net cost at plant | 8.42 | 4.74 | 3.31 | 2.37 | 1.87 |

1. Plants assumed to be operated in conjunction with other adjacent installations.
2. Annual production based upon 90 per cent on-stream time.
3. Operating labor figured at $2 per hour; operating time estimated at 12 man-hours per day for the 20 and 40-ton per day plants, 24 for the 80 and 160-ton per day plants, and 36 for the 320-ton per day plant. Additional labor for sulfur storage estimated at 1 man-hour per 10 tons.
4. Supervision and clerical include one superintendent at $650 per month, one foreman at $400 per month and one clerk at $310 per month. It is assumed that the 20, 40, and 80-ton per day plants require one-half the time of these personnel, while the 160 and 320-ton per day plants require their full time.
5. Taken at 4 per cent of plant cost.
6. 15 per cent of labor, supervision and clerical; 7.5 per cent of maintenance.
7. Water requirements estimated to be 5,000 gal. cooling water at $0.02 per thousand gallons, and 750 gal. boiler feed water at $0.05 per thousand gallons per ton of sulfur produced.
8. Based upon consumption of 40 kw.-hr. per ton of production at $0.005 per kw.-hr. and fuel gas at $0.05 per ton of sulfur.
9. Excess steam production 5,000 lb. per long ton of sulfur produced, valued at $0.20 per thousand pounds.

ated at a lower temperature to give maximum conversion. Gas from the second catalyst chamber finally passes through a sulfur wash tower in which the condensation and removal of elemental sulfur is accomplished. The residual gas which consists primarily of nitrogen, carbon dioxide, and water vapor is vented to the atmosphere, while the product sulfur which collects in the wash tower system is taken off to storage.

The optimum number of catalyst stages is determined by economic and atmospheric pollution considerations. A single catalyst bed may give conversions of up to 85 per cent, while the installation of two beds with intercooling, as shown in Fig. 2 and described above, may result in recoveries of over 90 per cent. Two stages with sulfur removal between the stages will provide somewhat higher recovery efficiencies; however, such a system is somewhat more expensive, as the installation of gas heating as well as cooling and condensing equipment between the catalyst beds is required. The use of more than two catalyst stages is seldom justifiable on an economic basis; however, if atmospheric pollution is a major problem, it is believed that with the use of a third catalyst stage plus precise automatic control, the process can be made to provide an ultimate conversion as high as 98 per cent.

### Investment and Operating Cost

For purposes of an economic comparison, plants will be considered which utilize the flow diagram of Fig. 2 and operate with a feed gas containing approximately 75 per cent hydrogen sulfide, less than 2 per cent hydrocarbons (predominantly methane), and the remainder carbon dioxide. This hypothetical acid gas stream is available from the stripping column of a gas-treating plant at 100° F. saturated with water and at a pressure sufficient to drive it through the sulfur plant. As other operating installations such as the gas-treating plant are necessarily nearby, it will be assumed that cooling water, treated boiler-feed water, electricity, start-up fuel and steam, and other utilities are available at the plant site for a reasonable cost.

On the basis of the above assumptions, approximate investment and operating costs for five sulfur plants of various sizes have been compiled in Table 2 and plotted in Figs. 3 and 4. The extreme dependence of operating cost upon plant size is immediately apparent; however, the minimum size plant which can be operated at a profit depends to a great extent upon plant location and other factors.

It will be noted that the tables and figures are based upon long tons of product sulfur. This is because bulk sulfur is customarily sold in units of long tons and the plant production is more important in profit studies than the quantity of feed;

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however, the quantity of hydrogen sulfide required by these plants can be approximated by multiplying the sulfur production capacity figures by one and one-third. This gives the required feed rate in short tons of hydrogen sulfide and is based upon a recovery efficiency of approximately 90 per cent.

In arriving at the figures used in Table 2, an attempt has been made to use typical values for such factors as depreciation, contingencies, taxes, and insurance. Specific companies may prefer to consider the depreciation of such a plant over periods from 5 to 20 years which can considerably alter the magnitude of the costs given but will not change the over-all shape of the curves in Fig. 4. Interest on the investment has not been considered as a cost of production as it is believed that part of the value of such a study is the determination of the effective interest on the investment or per cent return that the proposed project will realize.

No cost has been assigned to the $H_2S$ raw material in these studies as it is assumed that the sulfur plant will be owned by the company which is treating the gas. However, in some cases this factor may have to be considered. Obviously, the value of the $H_2S$ will be dependent upon the nature and scope of the operations. A large plant in a good marketing area can afford to pay an appreciable amount for the $H_2S$; on the other hand, it may be necessary to credit a small sulfur plant for the nuisance-abatement value of $H_2S$ disposal where air pollution is a major problem. It is reported that the Mathieson Chemical Corp. sulfur plants at McKamie and Magnolia pay royalties to the gas-cleaning companies producing the $H_2S$ of 3/16 and 7/32, respectively, of the value of the sulfur recovered.[4]

Operation of the sulfur plants is essentially automatic, the only continuously operating moving parts being the air blower and sulfur pumps with their drivers. The principal duties of the plant operator are keeping these pieces of equipment lubricated, maintaining proper boiler operation, running routine analyses on the tail gas to maintain the optimum $H_2S:SO_2$ ratio in the plant (by adjusting the air rate) and watching for any irregularities in the plant performance.

A full-time plant operator is not required by small sulfur plants unless they are remote from other installations. Since the sulfur plants being considered for this study are assumed to be operated in conjunction with a gas-treating plant, the estimates are based upon one-half the time of an operator for the 20 and 40-ton per day plants, a full-time operator for the 80 and 160-ton per day plants, and one and one-half operators for the 320-ton per day plant. Allocation of the time of supervisory and clerical personnel is shown on the Table.

Additional operating labor to the extent of 1 man-hour per 10 tons of sulfur is provided to assist in pumping the sulfur to storage and handling it at this point; however, the costs of loading sulfur on trucks or railroad cars, intermediate trucking to a railhead, and rail freight are not included.

Because the gas-treating plant which supplies acid gas to the sulfur-conversion operation requires a large process steam load for reboiler duty, credit is taken for excess steam produced by the sulfur plant to the extent of $0.20 per 1,000 lb. of 200-psig. steam. On the basis of electrically driven pumps and air blower, it is estimated that an average of 5,000 lb. of excess steam will be available per long ton of sulfur produced.

The costs at the plant shown in Table 2 and Fig. 4 represent the total costs for producing the sulfur and delivering it to storage. They do not include indirect overhead costs of the parent company, sales and distribution costs, profits or taxes. These items should, of course, be considered in a complete profit study for any specific case, and other possible costs such as the severance tax, which some states exact for producing sulfur, should be carefully investigated.

The operating costs for an isolated sulfur plant or one operated by a separate company would be appreciably higher than for the case used in this study. Labor cost in particular would be high as labor and supervisory personnel could not divide their time with other operations; however, the increased cost resulting from a separate installation would be almost negligible for large plants.

### Sulfur Marketing

The base price for sulfur at any locality is determined by the Gulf Coast mine price, plus the minimum cost of transportation. Where water transportation is available, it is generally more economical than rail for long hauls, although rail is competitive for transportation of sulfur from the Gulf Coast to West Coast areas. The following are typical rail freight rates (in effect September 1951) from Gulf Coast points for crude bulk sulfur in carload lots:

| Destination— | Freight rate for sulfur: Per 100 lb. | Per long ton |
|---|---|---|
| Los Angeles or San Francisco | $0.55 | $12.32 |
| Northwest Coast areas (including Lewiston, Idaho) | 0.72 | 16.13 |
| Chicago | 0.42 | 9.41 |

These may be compared with the following rates, which have recently been established for the shipment of bulk sulfur from Worland, Powell, Cody, and Thermopolis, Wyo., to western and northwestern areas:

| Destination— | Freight rate for sulfur: Per 100 lb. | Per long ton |
|---|---|---|
| Los Angeles or San Francisco | $0.55 | $12.32 |
| Northwest Coast areas | 0.49 | 10.98 |
| Lewiston, Idaho, or Spokane, Wash. | 0.44 | 9.86 |

The above freight rates include all increases to date, but not the 3 per cent transportation tax, which must be added:

Large potential markets for sulfur produced in western and northwestern states exist in the phosphate fertilizer mining and manufacturing areas of Idaho, Montana, Wyoming, and Utah, and in the paper-pulp manufacturing area of the Pacific Northwest, which is estimated to consume over 500 tons per day. Chemical plant and refinery operations near Los Angeles and San Francisco also represent a market for a considerable quantity of sulfur.

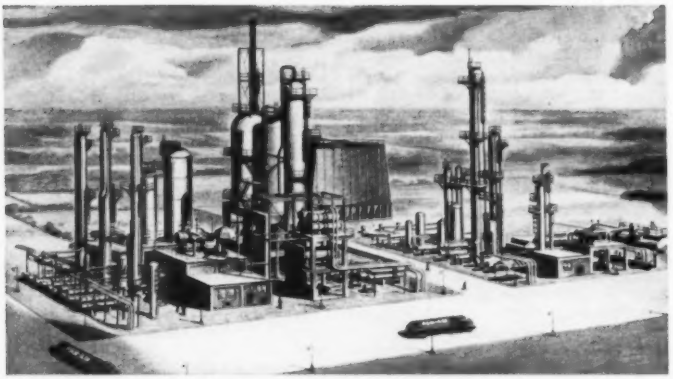
At this writing the price of crude bulk sulfur is $21 to $22 per long ton at the mines in carload lots. Because of this low base price, the cost of transportation represents a considerable portion of the selling price in most consuming areas. The current selling price is not a true indication of market conditions, however, as the demand greatly exceeds the supply; and in fact, a recent NPA order (M-69 effective July 1, 1951) limits industry to the same amount of sulfur it used in 1950 and permits suppliers to ship sulfur only when specifically authorized by NPA.[5]

### Conclusions

The net cost of producing sulfur in a plant associated with other operations under the conditions assumed in this study varies from approximately $8.42 per ton for a plant capable of producing 20 long tons per day to less than $2 per ton for a 320-ton per day installation.

The minimum size plant which is economically feasible will depend upon the desired return on invested capital and administrative, sales, and distribution costs, as well as the plant operating costs estimated above. If it is assumed that sulfur can be sold at the plant for $22 per long ton and that loading, company overhead, sales and distribution costs amount to 10 per cent of this amount or $2.20 per ton, then a 20-ton per day plant would show an annual profit of approximately 30 per cent of the initial investment before taxes. This latter figure is probably close to the lower limit which would be considered attractive to venture capital; however, other factors such as a local or company demand for sulfur or air pollution considerations could render a unit of considerably less

*(Continued on page 177)*



**Some of the major units being constructed at Pan-Am Southern's Destrehan, La., refinery. (Sketch by Lummus Co.) Shown are the vapor-recovery unit, cooling tower, and alkylation unit.**

# Pan-Am Southern Enters Petrochemical Field

## Company builds one entirely new unit, and revamps polymerization unit at El Dorado refinery. Activity in other divisions expanding rapidly.

**by F. Lawrence Resen**
Gulf Coast District Editor

CONSTRUCTION of two petrochemical units at Pan-Am Southern Corp.'s El Dorado, Ark., refinery signalizes the company's entrance into the petrochemical field, and suggests how small refineries can adapt themselves to produce valuable chemical derivatives from petroleum. Chief entrants to the field to date have been chemical companies or separate companies and plants developed within the oil industry, such as Shell Chemical Corp. and Lion Chemical Co. The magnitude of most petrochemical ventures precludes inclusion as part of an existing refinery.

Adaptation of existing units in refineries to take advantage of a limited range of petrochemicals, easily convertible from refinery runs, has been increasing sporadically over the past few years. It was logical for small refineries to survey their petrochemical potentialities, and Pan-Am Southern's present program is a natural development.

### New Petrochemical Units

An entirely new unit was built at El Dorado for the production of polybutenes. Thus Pan-Am Southern becomes one of three refineries producing this vitally needed chemical. Polybutenes are used in lubricating-oil additives, caulking and sealing compounds, in surface-coating materials, in aluminum roll oil, and for other industrial purposes. Present plans call for the unit to produce 2,000,000 gal. annually, more than is currently being sold in the nation. Demand for the product, currently in short supply, indicates a consumption of 2,500,000 gal. annually, up from the 1,500,000 gal. now being used.

The other phase of the construction program at El Dorado was the revamping of the polymerization unit, to enable it to manufacture propylene tetramer, used in the manufacture of synthetic detergents. Flexibility of operation has been maintained, however, so that the unit may be switched back to producing gasoline polymer, depending on market conditions. An annual output of 3,400,000 gal. of tetramer will be realized from full-scale operation of the unit.

In addition to its petrochemical expansion, the story of Pan-Am Southern's progress is of interest in the manner in which it parallels the vigorous growth of the oil industry along the Gulf Coast and elsewhere. For 23 years, as Pan American Petroleum Corp., the company concerned itself principally with marketing, and the operating end was a negligible factor. In 1949, a merger with Root Petroleum Co. initiated a new era, and with it came the refinery-expansion program and emphasis on exploration and production.

At El Dorado the expansion plan resulted in an increase in plant capacity from 21,000 to 30,000 bbl. per day and a considerable stepping up in flexibility of plant operations, plus the venture into petrochemicals. A delayed coker was installed to utilize residual fuels which were being displaced from the market by diesel fuels. A natural followup to this was the addition of a second fluid catalytic cracker to process the gas oil being obtained from the coker.

With defense demands increasing the need for aviation alkylate, the HF alkylation unit was rehabilitated and modernized after having been shut down after World War II.

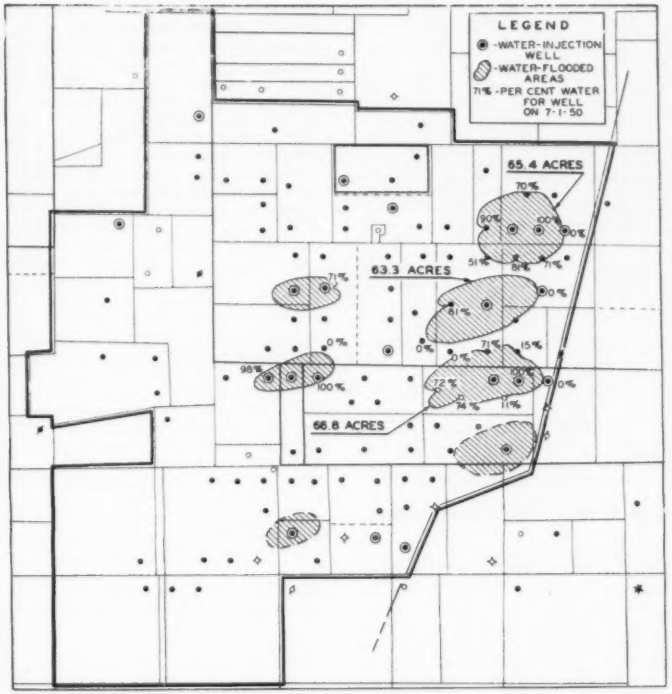
**Destrehan plant.**—The major expansion is taking place at Destrehan, La., where a former 8,000-bbl. topping plant is being improved and expanded. This plant is thus becoming a balanced refinery with a crude charge of 30,000 bbl. daily. Extent of the installations can be seen in the major units being added, which include a new Type IV, 12,000-bbl. fluid catalytic cracking unit, a sulfuric acid alkylation unit, the first commercial fluid hydroformer to be built, a delayed coking unit and vapor-recovery units. Moreover, the existing crude unit has been revamped.

Since the changes are so many and so diversified, the effect is virtually that of a new plant, designed for flexible and efficient modern operations.

**Exploration and production.**—Pan-Am Southern concentrates its operations in exploration and production in Arkansas, Louisiana, Mississippi, and Oklahoma. Its producing acreage has more than tripled the 1,100 acres of 1949, and a continuing emphasis is being placed on the development of production. To date, 7,500,000 bbl. of proven oil and gas reserves has been acquired. These will be recoverable over the next 10 years.

### Organization

Pan-Am Southern Corp. is a subsidiary of Standard Oil Co. (Ind.). President is Bruce K. Brown, due back in June from his position as deputy administrator of Petroleum Administration for Defense. Roy J. Diwoky, executive vice president, has been serving as company head. Richard T. Colquette is vice president in charge of manufacturing, Milton C. Hoffman is vice president for exploration-production, Robert L. Aycock is vice president in charge of supply and transportation, T. W. Hughes is financial vice president, and Harry S. Read is vice president in charge of marketing.




**Trend of water-flood movement. Heavy line indicates unitized area.**

## *CASE HISTORY: KIRK FIELD*

# Water-Flooding Project

### *Eastland and Comanche Counties, Texas*

**by P. S. Ervin**

KIRK field is located approximately 3 miles east of Gorman and 23 miles southeast of Eastland, in Eastland and Comanche counties, Texas.

Engineering studies of water-flood possibilities were commenced in the latter part of 1948. The recommended pilot water injection operations were started in May 1949.

The field was unitized in January 1950 and all production from September 1, 1949, was distributed on participation factors based 25 per cent on wells and 75 per cent on acre-feet. The area east of the north-south trending fault, identified as East Kirk field, is not included in this project.

#### Discovery and Development

The field was discovered by Skelly Oil Co. 1 Miears drilled in 1919.

**Prior to 1948.**—There had been only three wells drilled within the field limits prior to 1948. These three early wells were all drilled before 1930 and had a long productive life due to the large area being drained. Two of the wells were low capacity because of their edge location with respect to the accumulation. All three were still producing in February 1948. Their total recovery is estimated at 225,000 bbl. at the time the new development began. The Skelly 1 Miears was producing over 8 bbl. per day in the early part of 1948.

**After early 1948.**—In February 1948 the McKissick 1 Miears well was completed as a south offset to Skelly Miears lease. This started additional activity which resulted in almost complete development although the south side of the field has not been defined even now. By March 1949 there were 106 producing wells in the field. Well potentials on original completions were as high as 400 bbl. per day. Average for the field was approximately 125 bbl. per day.

#### Production Characteristics

Average oil gravity is between 40° and 41° A.P.I. at 60° F. Original gas-oil ratios were 400 to 1,000 cu. ft. per barrel. Gas-oil ratios increased rapidly after completion and well capacities declined inversely in proportion. By July 1949 the wells generally would bleed 30,000 to 50,000 cu. ft. of gas per day with ½ to 1 bbl. of oil, with one notable exception. This well, the Johnson 4 Sanders, is located in the southeast part of the field near the fault, and was producing 20 to 25 bbl. of oil per day along with considerable water. It is possible that the water originally produced was leaking from the fault into the producing formation. This was the only well in the field that produced extraneous water although after the reservoir pressure of the field was partly depleted, some wells apparently produced slight quantities of connate water.

By July 1949 the reservoir pressure had decreased from an estimated 1,300 psig. to approximately 350 psig., and the field production was approximately 80 bbl. of oil per day. Cumulative field production to August 1, 1949, was 643,631 bbl.

#### Geology of Kirk Field

The producing section is known as the lower Marble Falls limestone. Over-all thickness is 70 ft. The Marble Falls lime underlies the Caddo limestone, both of which are Pennsylvanian in age.

The pay formation in Kirk field consists of two porous lime sections, each approximately 7 ft. in thickness, separated by 8 to 14 ft. of nonporous limestone. Alternately one of these porous zones thins and apparently disappears as an effective producing section in some parts of the field.

**Cores.**—One well drilled late in 1948 was cored. One piece of core

## Editor's Note

**An unusually interesting water-flood operation is described in this report, which is complete not only as to reservoir and production data, but also cost figures.**

**Perhaps even more important, this water-flood operation was conducted in a formation broken by a system of vertical fractures. In transmitting the report to The Oil and Gas Journal for publication, the author pointed out this fractured pay-zone condition, and suggested that the Kirk water-flood might be of particular interest to many engineers currently interested in the Spraberry area development (West Texas) which also has a well-recognized fracture condition in its reservoir pay.**

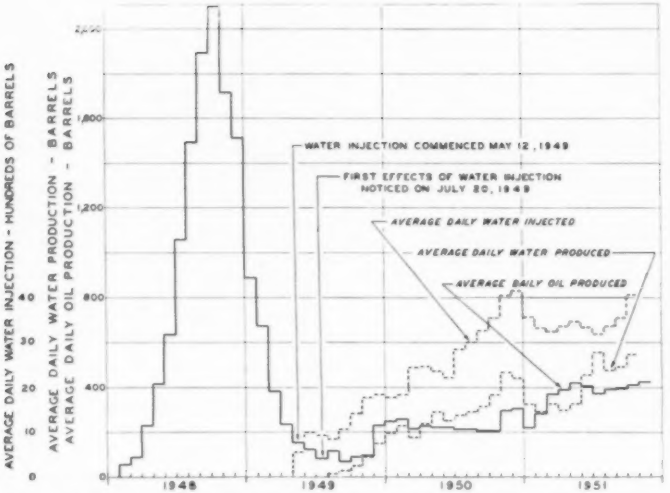

AVERAGE DAILY WATER INJECTION - HUNDREDS OF BARRELS
AVERAGE DAILY WATER PRODUCTION - BARRELS
AVERAGE DAILY OIL PRODUCTION - BARRELS
WATER INJECTION COMMENCED MAY 12, 1949
FIRST EFFECTS OF WATER INJECTION NOTICED ON JULY 20, 1949
AVERAGE DAILY WATER INJECTED
AVERAGE DAILY WATER PRODUCED
AVERAGE DAILY OIL PRODUCED
1948
1949
1950
1951

**Fig. 1—Kirk oil-production and water-flood history, Marble Falls limestone.**

from the oil-productive section, vuggy in character, had a porosity of 11 per cent permeability of 21 md. Junk in the hole caused poor recovery for this particular diamond-drilled core. From curves based on restored-state methods, interstitial water was estimated at 30 per cent of pore space. The two porous producing sections are apparently broken by a system of vertical fractures.

The accumulation of oil is the result of disappearance of porosity and permeability. The stratigraphic trap is intersected by a north-south trending fault of 150 ft. displacement which separates the production into the main Kirk field and East Kirk field.

Closure is limited to between 20 and 40 ft. in various field areas, and only slightly more against the fault. As mentioned previously the south side of the field has not been defined.

In studying the field, a cross-section was prepared showing the pay sections by electrical logs of four typical wells, with drilling times plotted and estimated effective porous sections indicated.

### Production History and Reservoir Data

Subsequent to the completion of the McKissick 1 Miears (February 1948), oil production increased rapidly with the drilling and completion of new wells, reaching a peak of 65,370 bbl. in October 1948 (210 bbl. daily). Production subsequently declined to 2,474 bbl. in July 1949.

Primary recovery to August 1, 1949, was 643,631 bbl. and total ultimate primary recovery was estimated at not over 687,500 bbl. or 5.75 per cent of original stock-tank oil in place. Ultimate primary recovery from the 2,944 productive acres would therefore have been 234 bbl. per acre or 21 bbl. per acre-foot.

**Reservoir pressure data.**—Original reservoir pressure is estimated at 1,300 psig. This is based on an average water gradient and the depth, supported by several drill-stem tests showing shut-in bottom-hole pressure in excess of 1,200 psig.

By January 15, 1949, the average reservoir pressure was measured at 419 psig. Subsequent surveys on November 15, 1949, May 15, 1950, and January 19, 1951, gave areally weighted pressures of 310.9, 338.8, and 328.1 psig., respectively. The last-measured bottom-hole pressure was 330.2 psig. on July 12, 1951. The injection of water has had no effect on the weighted average reservoir pressure except in elimination of some of the lower-pressure areas from the measurements.

**Reservoir fluid data.**—A sample of the produced oil and gas taken from a separator operating at 73 psig. on the W. B. Johnson Drilling Co.-Sanders lease was recombined in the laboratory by Core Laboratories, Inc.. At a pressure of 1,887 psig. and a temperature of 122° F. 1 bbl. of stock-tank oil had absorbed 435 cu. ft. of gas as measured at standard conditions. This resulting fluid was analyzed in the usual manner and results of the differential liberation as to shrinkage, gas in solution, viscosities, and probable saturation pressure were obtained.

Gas in solution and shrinkage were determined by differential and flash liberation. By differential liberation, gas in solution at the estimated original reservoir pressure of 1,300 psig.

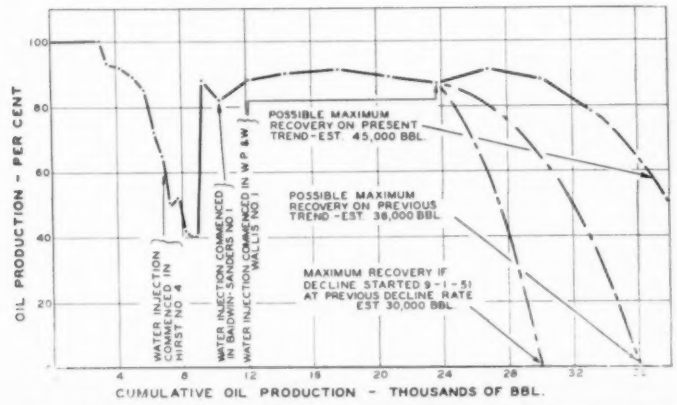

OIL PRODUCTION - PER CENT
POSSIBLE MAXIMUM RECOVERY ON PRESENT TREND - EST. 45,000 BBL.
POSSIBLE MAXIMUM RECOVERY ON PREVIOUS TREND - EST. 38,000 BBL.
MAXIMUM RECOVERY IF DECLINE STARTED 9-1-51 AT PREVIOUS DECLINE RATE EST. 30,000 BBL.
WATER INJECTION COMMENCED IN HIRST NO 4
WATER INJECTION COMMENCED IN BALDWIN-SANDERS NO 1
WATER INJECTION COMMENCED IN W P & W WALLIS NO 1
CUMULATIVE OIL PRODUCTION - THOUSANDS OF BBL.

**Fig. 2—Water production-cumulative oil, for Baldwin 1 J. A. Watson well. This shows production performance for a well affected from different directions of water flood, and affected by trapping of oil by the water injection wells.**

### THE AUTHOR

**P. S. Ervin is partner in consulting engineering firm of Speller & Ervin, Tyler, Tex. Among oil fields and recovery projects Ervin has worked on are: In Louisiana—Haynesville, Southwest Lisbon, Old Lisbon, East Haynesville; in Texas—Kirk, Tri-Cities, Henderson, Pickton, Merigale-Paul.**

**Ervin is a graduate in petroleum engineering from Louisiana State University, and worked with the Louisiana Department of Conservation for several years, including position as chief engineer 1941-1944. He was then with the Haynesville, La., Operators Committee in the gas-injection and subsequently water-flooding project on that unitized 14,000-acre Pettit Lime field, lastly as chief engineer, before forming his firm in Tyler.**

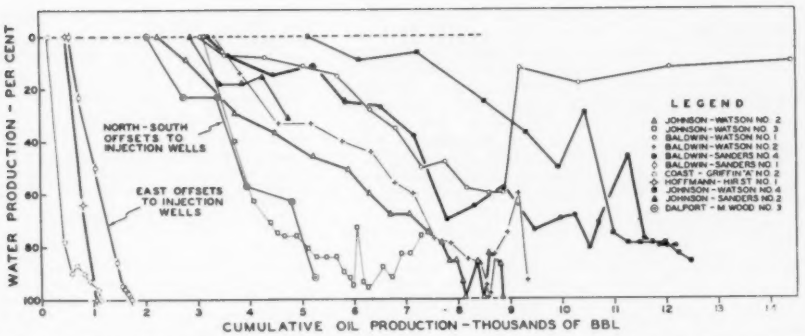

WATER PRODUCTION - PER CENT
CUMULATIVE OIL PRODUCTION - THOUSANDS OF BBL
NORTH - SOUTH OFFSETS TO INJECTION WELLS
EAST OFFSETS TO INJECTION WELLS
LEGEND
JOHNSON - WATSON NO. 2
JOHNSON - WATSON NO. 3
BALDWIN - WATSON NO. 1
BALDWIN - WATSON NO. 2
BALDWIN - SANDERS NO. 4
BALDWIN - SANDERS NO. 1
COAST - GRIFFIN "A" NO. 2
HOFFMANN - HIRST NO. 1
JOHNSON - WATSON NO. 4
JOHNSON - SANDERS NO. 2
DALPORT - M. WOOD NO. 3

**Fig. 3—Water production-cumulative oil recovery by water flood. Note the two classes of oil wells, as offsets to water injection wells.**

was found to be 383 cu. ft. per barrel. By differential liberation the formation volume factor was found to be 1.205 bbl. of reservoir oil per barrel of stock-tank oil at 1,300 psig.

Viscosity of the reservoir fluid ranges from 0.58 cp. at 1,300 psig. to 1.66 cp. at 0 psig. and at 122° F. reservoir temperature.

Assuming the reported initial produced gas-oil ratios of 400 to 500 cu. ft. per bbl. were correct, it is apparent that the reservoir crude was saturated at the original reservoir pressure.

### Pilot Water-Injection Operations

Initial injection operations were commenced in one well on May 12, a second on May 20, and the third on June 25, 1949.

**Quick results.**—On July 29 and July 20, 1949, results were noted on one offset well to the first two injection wells, respectively, and on September 23 effects were noted on one offset to the third injection well. Cumulative water injected when effects were noted were 25,000, 28,000, and 40,000 bbl., respectively. In each case the first well affected was an east offset at approximately 660 ft.

By the end of December 1949, 13 direct offset wells had been affected by the water injected into the initial three water-injection wells. During that month production averaged 228 bbl. per day and on 1 day production was 314 bbl. In the early part of 1950 water-injection facilities were expanded from the original pilot stage and have been added to continuously since that time.

**Injection history.**—From the initial stages through November 1951, 2,478,306 bbl. had been injected into 21 wells at maximum pressures of 700 psig. Water production reduced this figure to a net of 2,218,786 bbl. Injection volumes were averaging 3,950 bbl. per day during November and water production was averaging 545 bbl. per day. The ratio of cumulative water injected to cumulative oil produced was 11.0 bbl. water to 1.0 bbl. oil at the end of November 1951.

Raising of tubing in high-water-percentage producing wells has extended the economic life of the marginal wells and as a consequence average daily water production is somewhat higher than would ordinarily be expected because of continued production of these wells.

### Production History Since Water Flooding

Fig. 1 shows the production history of the field before and during the water-flooding operations. Cumulative production to the date the first wells were affected by the water flooding is estimated at 643,631 bbl. and production since that time (August 1, 1949) has been 229,113 bbl., of which 225,135 bbl. was produced from wells directly affected by the injected water.

An example of the results to be expected when a well is affected by the fillup and trapping of oil in a particular area by the injected water is shown in Fig. 2. At the end of November 1951 this well had produced 33,241 bbl. since first being affected by water injected.

The area in which this well is located is surrounded now by five water-injection wells. The production from the well, when first affected, was never over 40 bbl. of fluid per day. Subsequently to being trapped, the production has not been less than 100 bbl. of fluid per day with a marked decrease in percentage of water production, as will be noted from the figure. None of the other wells affected have produced from areas where the oil has been trapped in this manner but have produced only the oil moved fairly close to the well bore because of the low bottom-hole pressures. Similar effects have been pointed out very clearly by George L. Buckles.[1]

### Effects of Formation Fractures

Although oil operators familiar with the history of other Marble Falls lime production were not surprised at the low primary oil recovery of this reservoir, to say that the operators who developed this field were disappointed is to state an obvious conclusion, especially in view of the good initial production. The estimated ultimate primary recovery of 234 bbl. per acre indicates that one well to 160 acres (or 18 wells on the 2,944 productive acres) would have resulted in a return of about $2.50 for $1.00 invested, assuming approximately the same recovery.

In view of the development expense for 103 additional wells (besides the three old wells), the operators who were 40 per cent paid out by August 1, 1949, considered themselves very lucky.

Early in the life of the water flood, a trend of water movement and oil production was noticed which may explain the very low-percentage primary recovery of the original oil in place. This trend is marked by the recovery of 2.70 times as much oil from wells located in the north-south and northwest - southeast directions from a water-injection well as the recovery from wells located in the east-west and northeast-southwest directions from a water-injection well. We have called these results the "effect of formation fractures" (see Fig. 3).

One east-west offset well produced a total of only 38 bbl. of oil and another produced only 483 bbl. of oil before producing 100 per cent water. These are east and west offsets, respectively, to the same water-injection well and were producing 100 per cent water within 3 months after injection commenced.

It was also noticed that wells at greater distances than direct offsets, even in an east-west direction, produced considerably more oil per 100 ft. of distance from an injection well. The total oil recovery (estimated) to 100 per cent water for the north-south offsets is 7,960 bbl. oil (arithmetic average), while estimated total oil recovery for the east-west offsets is 3,660 bbl. oil. The data for the one well which has apparently been affected from more than one injection well and from more than one direction (the Baldwin 1 J. A. Watson) was not used in the averages, nor was the well which only produced 38 bbl.

On Fig. 3 are plotted data on water percentages versus cumulative oil production for some of the wells.

We are of the opinion that the differences in recoveries between the east-west and north-south offsets to the water-injection wells are probably the result of fracture systems in the Marble Falls lime producing

**TABLE 1**

**Original Oil in Place and Estimated Ultimate Recovery by Water Flooding, Kirk Field Unit**

| | |
|---|---|
| Total productive area, acres | 2,914 |
| Average net effective thickness, ft. | 11.19 |
| Total productive reservoir volume, acre-ft. | 32,931 |
| Original oil in place, bbl. (material balance) | 11,301,000 |
| Original oil in place (volumetric calculations): | |
| Porosity, avg. (per cent) | 8 |
| Connate water, avg. (per cent) | 30 |
| Bbl. reservoir oil per bbl. stock-tank oil (FVF) | 1.20 |
| Original oil in place, reservoir barrels | 435 |
| Original oil in place, stock-tank barrels | 363 |
| Total original reservoir oil in place, bbl. | 14,325,000 |
| Total original stock-tank oil in place, bbl. | 11,954,000 |
| Ultimate primary recovery, est., bbl. | 687,500 |
| Ultimate primary recovery, est., per cent of original oil in place (vol. calc.) | 5.75 |
| Voidage from shrinkage down to 200 psig. (1.20-1.11) | 0.09 |
| Voidage from production of 5.75 per cent of oil in place (0.0575) (1.20) | 0.07 |
| Total void space in reservoir | 0.16 |
| Calculated displacement efficiency on 8-1-51, per cent | 22.7 |
| Total original oil in place, stock-tank barrels (est.) | 11,954,000 |
| Total ultimate primary recovery, stock-tank barrels (est.) | 687,500 |
| Total stock-tank oil remaining (est.) | 11,266,500 |
| Additional recovery by water flooding, per cent (est.) | 22.7 |
| Additional recovery by water flooding, bbl. (est.) | 2,560,000 |
| Additional recovery by water flooding to 12-1-51, bbl. (est.) | 225,135 |
| Additional recovery by water flooding (est.) | 2,334,865 |
| Additional volume of water to be injected, bbl. (est.) | 13,825,000 |
| Time to inject water at 4,000 bbl. per day (days) (est.) | 3,455 |
| Average oil production per day over 9.5 years, bbl. (est.) | 677 |
| Average water injected/oil produced ratio, bbl./bbl. | 6.38/1.0 |

section, the fractures apparently either being more extensive in one direction than in the other or running generally across the field in only one direction. We do not think that the recovery of 38 bbl. and 483 bbl. total oil from water drive from the west and east offsets to the same injection well could have been the result of any formation characteristic other than fractures. The primary recovery from wells in the vicinity of this particular injection well was unusually low compared to that from the average wells. Two wells located on the lease, one of which was converted to the injection well, produced a total of only 2,872 bbl.

### Estimated Recovery by Water Flooding

In Table 1 are shown estimates of productive area, average net effective feet, and total productive reservoir volume in acre-feet. Material-balance and volumetric calculations indicate that total original oil in place was between 11 and 12 million barrels, although to get this close agreement the average porosity over the reservoir was estimated at 8 per cent whereas actual measurement of an isolated piece of core gave 11 per cent. Assuming the volumetric calculations of 11,954,000 stock-tank barrels to be correct, the estimated ultimate primary recovery of 687,500 bbl. represents only 5.75 per cent of the original stock-tank oil in place.

From the areas flooded and the net volume of water injected on August 1, 1951, it is estimated that the additional recovery by water flooding would amount to 22.7 per cent of the stock-tank oil remaining in place. This would total 2,560,000 bbl. or 2,334,865 bbl. from December 1, 1951. At the present rate of injection it will take 9.5 years to flood out the productive area of Kirk field. Additional work is planned to determine whether both permeable zones are being flooded or can be flooded to increase the recovery efficiencies.

### Water-Flood Investment and Profit

The water-injection system is divided into two parts, one on the east side and one in about the center of the field.

**East-side system**

Pumps—Two Wheatley duplex double-acting, with bronze fittings (2½ to 4-in. by 6-in. stroke). Powered by Waukesha X-AHU 20-36-hp. gas-gasoline engines, each capable of handling 900 to 1,100 bbl. per day at 700 psig.

Water supply—Three shallow small-diameter water-producing wells, one shallow dug water-producing well. One 138-ft., 18-in. diameter water-producing well (8⅝-in. casing).

Three electric jet-type pumps; two jack-type pumps with gas engines. One 500-bbl. water-storage tank.

Necessary 4 and 2-in. lines to carry water to nine water-injection wells, equipped with fluid meters.

**West-side system**

Pumps—Four Wheatley duplex double-acting driven by Waukesha and Allis-Chalmers gas-gasoline engines. (Same as above.)

Water supply—One 190-ft., 18-in. diameter water-producing well (8⅝-in. casing).

One Western turbine 6-in. four-stage shaft-driven (submerged) centrifugal pump with Amarillo gear head and Waukesha X-AHU 20-36-hp. gas-gasoline engine; rated at 5,150 bbl. per day at 3,450 r.p.m. One 500-bbl. water-storage tank.

Necessary 4, 3, and 2-in. lines to carry water to 11 injection wells, equipped with fluid meters.

**Investment.**—Total cost of injection facilities, including labor for laying of lines has been $40,499 to date. No work has been necessary on the wells converted to water-injection wells other than several reperforation jobs, to assure that both porous sections were open to the well bore.

Necessary production and lease equipment (pump jacks, engines, rods, and pumps) has totaled $29,060 and some additional equipment is needed at present.

**Operating expenses.**—To December 1, 1951, this has totaled $183,441.

**Totals.**—All expenses, costs, and investments to December 1, 1951, are $253,000. Total income to seven-eighths working interests is $560,775 and net profit to date is $253,775. Additional injection-system investment will, of course, be needed in the future in order to keep the in-

**TABLE 2—WATER-FLOOD COSTS, INVESTMENT, AND NET PROFIT TO DATE. KIRK FIELD**

| | | |
|---|---|---|
| INJECTION EQUIPMENT: | | |
| Injection stations: | | |
| Water injection pumps and engines (6 at $2,374) | $14,244 | |
| Water wells: | | |
| 3 shallow, small-diameter drilled and 1 dug | 1,000 | |
| 2 190-ft. large-diameter drilled wells | 1,685 | |
| Tanks and connections (surplus) | | $16,929 |
| At injection wells: | | |
| Meters | 1,220 | |
| Chokes | 1,000 | |
| Valves (surplus) | | 2,220 |
| Injection lines: | | |
| Pipe: 4-in., 9,050 ft. | 9,050 | |
| 3-in., 500 ft. | 500 | |
| 2-in., 25,500 ft. (surplus tubing) | | |
| Laying lines (company labor, est.) | 11,414 | |
| Burying lines | 386 | |
| | | 21,350 |
| Injection equipment total | | $40,499 |
| PRODUCTION AND LEASE EQUIPMENT: | | |
| Pulling unit and half track | 7,500 | |
| Cars and trucks | 7,500 | |
| | | 15,000 |
| Pumping units: | | |
| Pump jacks | 4,213 | |
| Engines | 3,203 | |
| Rods | 644 | |
| | | 8,060 |
| Miscellaneous items | | 6,000 |
| Total | | $69,559 |
| All operating expenses to 12-1-51 | | $183,441 |
| Total of all expenses, costs, and investments to 12-1-51 | | 253,000 |
| Total income to seven-eighths working interests | | 506,775 |
| Total net profit to working interests | | 253,775 |

jection rate at or above 4,000 bbl. of water per day. The above figures do not include the original cost of drilling any of the wells.

Present operating expenses are running approximately $7,500 per month for the production of 12,500 bbl. of oil (410 bbl. daily) from 33 pumping wells, for an average operating cost of 60 cents per barrel.

**Discussion of Water Flood**

The Kirk field water-flooding operation has been expanded from the initial pilot-injection operations (in what was to have been a line-drive program, with two rows of injection wells running north and south) into a line-drive program with rows of injection wells running east and west across the field. This has been found necessary because of the "easier" movement of water in approximate east-west directions, due apparently to the presence of fractures.

The trend of these fractures has resulted in much better recoveries from wells located north and south of the injection wells than from wells located east and west.

The present status of operations of the water flood is not much beyond the pilot stage due to the reluctance of the operators to make large investments that would mean large assessments and deferred income. This was partly because until the oil was trapped in the area of the Baldwin 1 J. A. Watson well by use of five injection wells and until it reacted so favorably (Fig. 2) we could not be certain and could not have convinced the operators that such large assessments would be easily paid out. This was true even though the volumes of water injected and the surface areas underlain by injected water had convinced us early in the pilot-flood operations that there had to be a fair amount of the normal type of porosity in the two porous sections regardless of the volume and per cent of oil recovered during the primary phase of the production operations and the relatively small recoveries from the direct offset wells affected by the pilot water-injection operations.

Even though the shrinkage of oil that has occurred with the decline of reservoir pressure has left less oil subject to recovery and means that the residual oil that will be left in the reservoir is more in terms of stock-tank barrels, the high gravity and relatively low viscosity of the reservoir oil at the present reservoir pressure will advantageously affect the movement and recovery of the oil as a result of the water-flooding operations and will partly offset the losses due to shrinkage.

**Special Conclusions, Kirk Field**

1. It is our opinion that the producing characteristics exhibited under primary production methods and the behavior of the wells under secondary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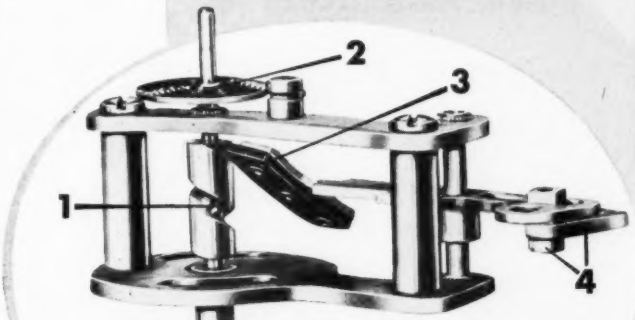


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water-flooding operations can be best explained by the presence of a system of vertical fractures, with major fractures running easterly and westerly across the field.

2. Although the presence of fractures and the too-dense development made primary production operations an economic failure, this is not necessarily true of the water-flood program in the same reservoir where sufficient numbers of wells are available for input and producing wells.

3. A development program of one well to 160 acres would have allowed a payout of $2.50 for $1.00 invested by primary production methods alone, even under the adverse conditions which are present in this reservoir (assuming the ultimate recovery would have been approximately the same).

4. It is our opinion that it is possible, based on the production of the three old wells produced before 1948 and the production history of the field after it was densely drilled, that on wider spacing the primary recovery from the field would have been actually greater than was true under the smaller spacing, which allowed the reservoir energy to be depleted through a large number of bore holes once the production channels (fractures) were saturated with gas.

5. The presence of fractures, of themselves, does not entirely preclude the possibility of economical pressure maintenance or secondary-recovery operations, even in such a highly fractured zone as the Spraberry sand of West Texas. The magnitude, extent, and directional trend of the individual fractures in a fracture system would largely determine the relative degree of success or failure in pressure-maintenance or secondary-recovery operations in such reservoirs.

6. The presence of fractures, even though they help to establish economical productive capacity, may not be conducive to the recovery of what is usually considered a normal volume or percentage of the original oil in place by the primary phase of the production operations.

### References


1. "Water Flooding Pays Off in South Ward Field," by George L. Buckles, The Oil and Gas Journal, August 9, 1951, p. 91.


## BOOKS

MINERAL WOOL INSULATION SPECIFICATIONS AND STANDARDS. Compiled by Industrial Mineral Wool Institute, 441 Lexington Avenue, New York. $3.20.

This handbook contains 21 specifications and standards, on both high and low-temperature mineral-wool insulations, by four government agencies and the American Society for Testing Materials. It is valuable as a guide for buyers, engineers, plant superintendents, specifications writers in selecting materials and application practices for government contracts and as a basis for specification within the industry itself.

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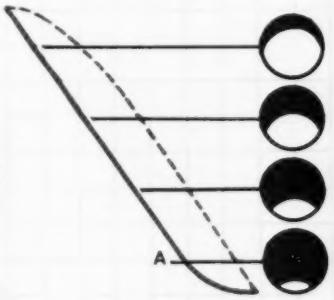


Dotted line shows closing curve of conventional gate valve.

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The curve above illustrates. From full-open to point A the rate of closing is almost straight-line. From point A (about 70% closed) the rate of closing slows up and approaches the fully closed position very slowly. In W-K-M Through Conduit Valves, the basic design of the gate and conduit provides just the right variable ratio of port area to gate travel to prevent surging, while the valve is operated at constant speed.

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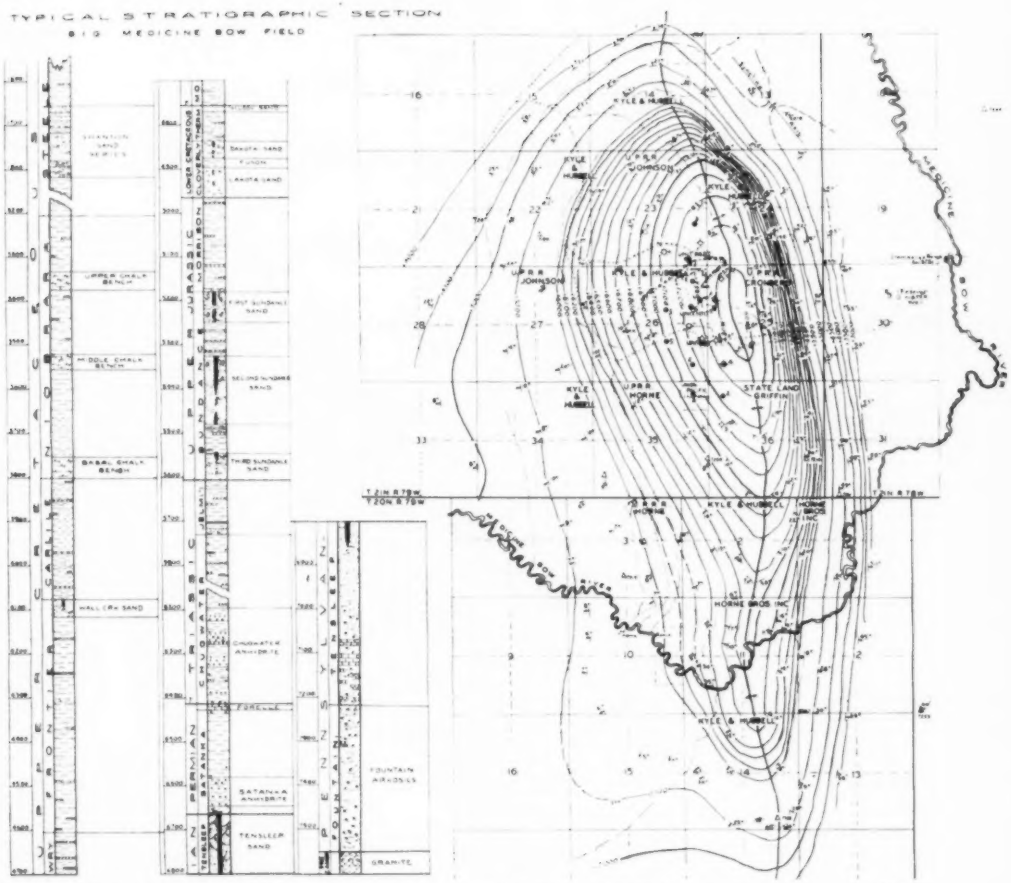


*Geologic map of Big Medicine Bow Structure contoured on "A" sand of Steele shale. Scale: 1 in. equals 2,000 ft.*

***PROGRESS REPORT:***

# Big Medicine Bow Field Carbon County, Wyoming

**by George Veronda***

BIG MEDICINE BOW structure is located in Carbon County, Wyoming, 14 road miles south of the Medicine Bow townsite, Union Pacific Railroad, and U.S. Highway 30, specifically in 20-21n-78-79w.

Big Medicine Bow field is situated on a high, flat, barren plateau averaging nearly 7,300 ft. in elevation. Climatic conditions correspond to the elevation. The plateau is continually swept by strong winds, winters are extremely severe, and summer rainfall averages less than 12 in.

*Geological staff, Ohio Oil Co., Casper, Wyo. Summary report from Guide Book of Sixth Annual Field Conference, Wyoming Geological Association

### History and Development

Search for oil on the Big Medicine Bow structure began in 1913. In that year William P. De Latt, of Denver, surveyed and established the location of lands involved in the "public domain," and those lands involved with the Horne Brothers, Cronberg, and Johnson ranches. These ranchers leased their oil placer tracts to De Latt, who in turn unsuccessfully offered the leases to several major companies, including Ohio Oil Co.

Late in 1913, however, the Hjorth Brothers, of Jamestown, N. Y., agreed to drill a test well for De Latt. This original well was located in the NW NE SE 26-21n-79w, and was designated as a 4,000-ft. test. Considerable difficulty was encountered during the course of drilling and the well was abandoned early in 1914 at a depth of 1,700 ft., with the surrender of leases.

The area then lay dormant until 1917. In that year, C. J. Hares, geologist for Ohio Oil Co., examined the structure and recommended it for drilling. Leases were secured and a test well, located in NW NW NW 36-21n-79w, was begun in July. The well was dry and abandoned in December

THE AUTHOR

**George R. Veronda joined Ohio Oil Co. in 1941 as petroleum geologist and engineer and is now district geologist in Casper, Wyo. He did his undergraduate and graduate work for master degree at University of Wyoming, and has spent his entire professional career in the Rocky Mountain and Great Plains areas. He is currently serving as vice chairman of the Geological and Engineering Reserves Committee, Rocky Mountain Region, and since 1948 has served on reserve committees for both the American Gas Association and the American Petroleum Institute. He is vice president of the Wyoming Geological Association and was Caravan chairman of the 1951 field conference. His papers include, Stratigraphy and Correlation of the Cretaceous of Western Nebraska, and numerous papers, and articles in guidebooks of the Wyoming Geological Association.**

at a total depth of 2,130 ft. Ohio then surrendered its leases, and the area was again inactive for 5 years.

In 1923 Southwestern Petroleum Co. and Cliff Petroleum Co., companies whose principal shareholders were from Buffalo, acquired the leases. The first test well of these operators was located in the SE NE SE 26-21n-79w. The well was drilled to a total depth of approximately 4,050 ft., and found a saturated sandy phase near 4,033 ft., which was probably a Frontier sand. This sand was reported initially to have produced 200 bbl. of oil per day but declined very rapidly. The well was deepened and became flooded with water and was abandoned.

**Interests sold.**—During the next 3 years, these operators drilled three additional wells, varying in depth from 2,185 to 4,970 ft., but all were nonproductive. In late 1926, after expending more than half a million dollars, the operators sold their equipment and all interests in their leases to The Texas Co.

This sale was subject to an agreement with Producers & Refiners Corp. which called for a 4,500-ft. well to be started prior to November 5, 1926. This well was located in NW SW NW 25-21n-79w, and was drilled to a total depth of 4,260 ft. in May 1927, dry and abandoned. As a result of this test and the expiration of portions of the leases, The Texas Co. sold its equipment and released all its interest in April 1928. The area was again dormant for a period of 5 years.

In 1933 Ohio Oil Co. conducted a thorough and detailed surface study of the structure. This study was accompanied by a limited seismic survey, such survey being made in an


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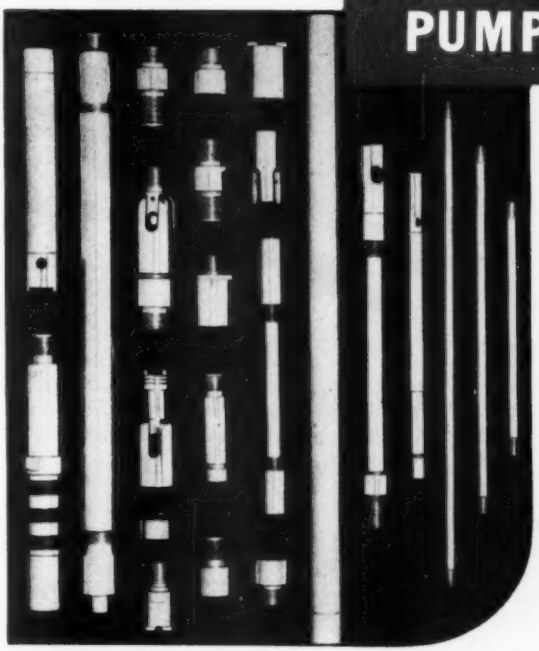

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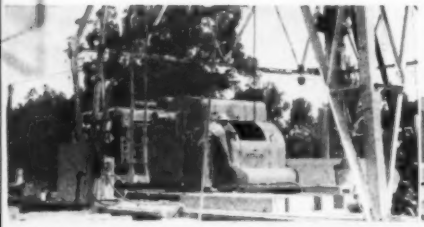
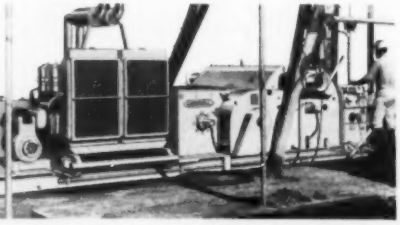


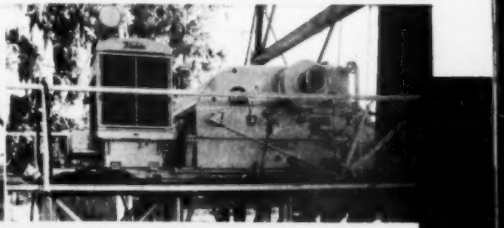
Model O, two- or three-engine draw works for 10,000-foot drilling or 15,000-foot workover.



Model D, with single-, twin-engine or two separate engines for 5,000-foot drilling or 10,000-foot workover.

Model S, single-engine draw works for 4,500-foot drilling or 10,000-foot workover.

Model L, single-engine draw works for 3,500-foot drilling or 7,000-foot workover.



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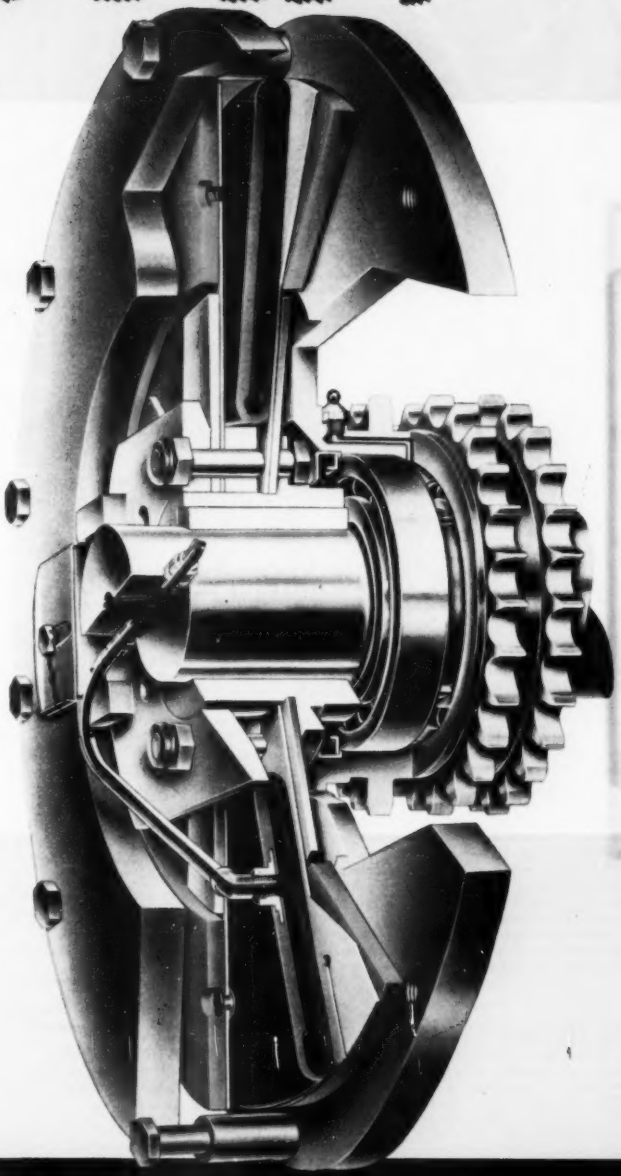

Our research on clutches has proved that when a clutch is engaged to pick up a load, the friction plates will not wear appreciably if:

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attempt to delineate the behavior of the axis with depth, but because the area was new and records were poor, the results of the survey were not considered conclusive. Thus on the basis of the surface work, principally, the decision was made that the structure was deserving of a deep test.

**Oil and gas discovered.**—Accordingly, Ohio Oil Co. assembled leases for the second time. Standard Oil Co. of California was offered, and accepted, a one-half working interest in all leases for sharing in the cost of drilling the first well. This well, 1 Kyle, NE SE NE 26-21n-79w, was spudded on December 2, 1934. It was completed June 6, 1935, at a total depth of 5,397 ft. The well had tested 81,000,000 cu. ft. of gas per day from the first Sundance sand and gushed oil at a rate in excess of 6,000 bbl. daily from the second Sundance sand. The gas was markedly "rich"; the oil was amber colored, 63° A.P.I. gravity. This discovery marked the opening of the "modern phase" of development in Big Medicine Bow field.

A total of 14 wells were drilled by the operator between June 1935 and January 1939. Of these, 11 were producers of gas or oil, and 4 were nonproductive. All production was from the first and second sands of the Sundance formation.

During the above period, the 3 Kyle well, NE SW NE 26-21n-29w, was deepened from 5,765 ft. in the second Sundance to 7,854 ft. in the Granite. No production was established below the Sundance, and the well was plugged back and recompleted in the first Sundance sand.

Development was then static until late 1947. At this time, the 6 Kyle well (Unit No. 1 on map), SE NE 26-21n-79w, was drilled as a new Tensleep test of the structure. This well was completed in June 1948 flowing 35 bbl. of oil per hour from the Tensleep sand. The Tensleep oil is greenish yellow in color and averages approximately 62° gravity. The Tensleep area was unitized, and two additional Tensleep tests were drilled in 1949. Unit 2 well was productive while the Unit 3 well was not. There has been no drilling in the field since December 1949.

Accumulated production of oil to January 1, 1951, was approximately 5,500,000 bbl., of which all except 200,000 bbl. has been produced from the sands of the Sundance formation.

### Stratigraphy

Locally, and surrounding the Big Medicine Bow structure, strata from Tertiary Wasatch to Upper Cretaceous Steele are exposed. Over the structure proper, only strata of the Mesaverde and Steele formations are involved. The Wasatch strata occupy the area west and northwest of the structure, as well as to the south and southeast.

Strata of the Lance formation occupy a narrow area to the west and northwest of the structure and paral-

ieling the belt of Lewis outcrops to the north-northwest. Strata of the Lewis formation completely encircle the structure. Mesaverde strata form the prominent escarpments around the fold and are draped over the fold in varying thickness except along the crest of the structure in the SE part of 21n-79w, where the Steele shale crops out.

A terrace of recent (?) gravels forms the flat plateau which enables the identification, and location of the structure from great distances.

**Pre-Mesaverde strata.** — A knowledge of the nature of the strata older than Mesaverde is gained from the wells drilled on the structure. The lithologic character, thickness, and intervals of the stratigraphic section from the Steel shale to the Granite are illustrated on the columnar section presented with the structural map, and are not discussed specifically in this summary.

It is sufficient for the reader to note, as illustrated in the columnar section, that the writer does not recognize the presence of any strata which could be assigned to the Mississippian or Cambrian. The deep wells drilled in this, and related areas, indicate that the strata are transitional from the Tensleep sand (or Casper formation) into the arkosic beds of the Fountain formation which lies directly upon the Pre-Cambrian.

Detailed lithological and paleontological studies may, however, prove that the predominantly carbonate sequence of strata near the base of the Tensleep sand may not be an actual part of the latter formation. Detailed discussions of the stratigraphy of the region are included in other papers presented during this conference as well as in numerous previous publications covering the general area.

### Structure

Big Medicine Bow fold is situated on the northwestern margin of the Laramie basin immediately southeast of the structural platform which delineates the Hanna and Laramie basins.

Big Medicine Bow is an elongate, generally north-south-trending, anticlinal fold. The surface axis is slightly sinuous trending generally through the east half of Sections 23, 14, 11, and 2, 20n-79w, and through the western margins of Sections 36 and 25, and SW¼ of 24, NE¼ of 23, and the E½ 14, 21n-79w. The fold is strongly assymmetrical both on the surface and in the subsurface; the east, or basinward flank, being the steep flank.

Dips near the surface axis are 2° or less, steepen to 20° or more on the west flank, 35° or more on the north nose, 55° or more on the east flank, and are generally less than 15° over most of the south nose.

The maximum surface crest is located in the W½ of Section 25, while the subsurface crest is formed in the E½ of 26-21n-79w. Surface closure is in excess of 2,000 ft. The general structural attitude of the field at the surface is illustrated on the structural map which accompanies this report.

The subsurface structure has been delineated by the wells drilled. No detailed discussion is attempted in this summary. It is sufficient to state that the subsurface structure, in general, parallels that presented by the surface structure. A northwest deviation of axial trend to N 17° W. is established in the subsurface, and known closure on the first Sundance sand is at least 700 ft. and is probably considerably greater.

## Gas-Storage Project

(Continued from page 141)

After the cement sets, the tubing is cut off above the cement and the replugging is completed in the same manner as if the original casing had been cemented when set.

5. If the well was a Wilcox well the procedure is the same as in the Dutcher well with uncemented casing with the exception of depth of redrilling. The hole is redrilled to the Wilcox depth, the formation is identified, and a cement plug sufficient to protect the Wilcox sand is placed at the bottom of the hole. This plug usually contains 100 sacks of cement.

6. In all the above cases the replugged wells are capped with an 8¾ by 2-in swedge nipple and a 2-in. plug valve.

The Depew plant contains four GMV-10-TF, 1,100-hp. Cooper-Bessemer, V-angle-type compressor units. Each unit has a capacity of approximately 40,000 M.c.f. of gas per day when operated at 500 psig. suction and 800 psig. discharge injection pressure; when operated at 500 psig. suction and 1,500 psig. discharge, each unit has a capacity of approximately 15,000 M.c.f. per day.

Each unit is rated at 1,100 hp. and is equipped with 10 power cylinders. These have a 14-in. bore and a 14-in. stroke and operate at 300 r.p.m. Each unit is equipped with five 8¼ by 14-in. double-acting compressor cylinders, and is equipped with a clearance valve in the outer head and with a suction valve lifter on the bed-end head.

The units were sold for an operating condition having a suction pressure varying from 400 to 700 psig. and a discharge pressure varying from 400 to 1,500 psig. In filling the storage the compressors will operate on the minimum suction pressure and minimum discharge pressure for a long period of time. However, as the storage capacity is reached, the compressors will be operating under a maximum suction and maximum discharge pressures.

Adjacent to the compressor station is the auxiliary room where all electricity for the plant is generated. Two PVG-6, 250-kva., 200-kw. (power factor 0.8) generators are installed completed with a pedestal-mounted 7½-kw. exciter set on the outboard bearing. These operate at 400 r.p.m. and generate a 480-volt, three-phase, 60-cycle current. Only one generator is operated at a time; the other is a standby facility.

The generator is direct-connected to a six-cylinder four-cycle natural-gas engine which has an 11-in. bore and a 13½-in. stroke.

The Mid-Continent's largest natural-gas triethylene glycol plant was recently completed at Depew. This unit was designed to dehydrate the gas as it leaves the underground storage reservoir. Design capacity of the plant is 200 million standard cubic feet per day. Unit is designed to operate at 400 psig. and 75° F. The absorbers are designed for operation at a maximum working pressure of 800 psig.

Present flow through the plant is 103 million standard cubic feet per day. Preliminary tests indicate an outlet dew point of —7° F. with gas entering at 68° F.

Gas enters the unit at pressures varying from 400 to 800 psig. at approximately 70° F. The total gas flow is split by automatic control valves so that equal flow is obtained through each absorber.

In the absorbers, the gas flows in countercurrent contact with the dehydrating agent, triethylene glycol. Water-rich glycol is automatically discharged from the bottom of each absorber through a heat exchange where it is preheated by hot glycol leaving the regeneration equipment.

From the heat exchanger, the hot glycol flows to the still column and reboiler where water is removed by fractional distillation. The reconcentrated glycol solution flows from the reboiler to the storage tank and then to the pumps for circulation through the glycol to glycol heat exchanger and a forced draft cooler and then to the absorbers.

Main glycol pumps for the plant are electrically powered. Each electric pump has a gas-powered standby pump. Glycol regeneration is carried out at atmospheric pressure with reboiler heat supplied by immersion-type direct-fired burners. Black, Sivalls & Bryson, Inc., designed and constructed this unit.

### Acknowledgments

Technical data for this report were furnished by C. E. Cloud, general superintendent; W. R. Kubista, chief engineer; Eugene Parker, resident engineer; and C. C. Ingram, assistant to chief engineer, all of the Oklahoma Natural Gas Co.'s offices in Tulsa, and to L. E. Cleveland, Depew, O.N.G. compressor-station operator. Ruth Canaday, Tulsa, O.N.G. assistant secretary and assistant treasurer, furnished several of the plant photographs used.

## Louisiana Conserving Gas

*(Continued from page 147)*

each field, and measuring 128 by 36 ft., were finally located in places which had been dredged out to a

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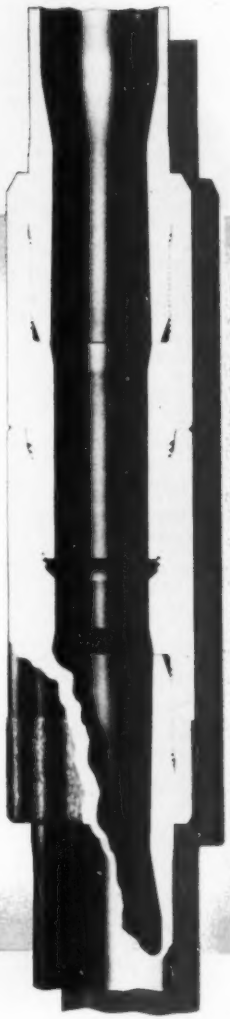

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uniform depth of 6.5 ft. The barges thus rest now on marsh or bay bottoms, as shown in Fig. 1, with the average water level being a few feet below the bottom deck.

It is estimated that the barges each cost somewhat less than $400,000, this figure including the costs of towing the barges in place and the costs of connecting into the gathering lines. They have a capacity of handling about 15 million cubic feet of gas daily, and of converting this gas from field pressures of 100 to 375 psi. up to the pipe-line pressure which at peak load will be about 800 psi. In general, only a one-man crew is required to maintain operations.

**The upper deck.**—Fig. 1 shows the units of the upper and lower decks in relation to each other. The enclosed area on the upper deck includes one small room housing the generators, cooling-water pumps, etc., and one large engine room where the gas - engine - driven compressors are located. Seen in the foreground of Fig. 1 are the gas dehydrators, the separators, and the distillate storage tanks. The walk to the right leads to a bunk house (having sleeping and eating accommodations) and to a gas-fired heater which for safety must be located at some distance from the compressor station proper.

Fig. 2 shows the interior of the engine room where the five two-stage Clark compressors (Type M.A. 8) are located. These compressors, acting in parallel and each delivering 200 hp., are fueled by natural gas. Each engine has two first-stage cylinders (compressing gas to 375 psi.) and two second-stage cylinders (compressing gas up to a maximum of 800 psi.).

Gas from the field separators (located with tank batteries at some distance from the compressor station) feed through gathering lines into the inlet scrubbers of the compressor station. These units are seen in the foreground of Fig. 1, and in more detail to the right in Fig. 3. Purpose of these inlet scrubbers is to prevent any oil getting into the compressors in the event of failure of one or more of the field separators.

The unit to the right in Fig. 3 is a 500-psi. working-pressure Parkersburg separator which feeds high-pressure field gas at about 375 psi. directly into the second stage of compression. The other unit shown in Fig. 3, a 125-psi. Parkersburg separator, feeds low-pressure field gas into the first stage of compression. This scheme greatly increases the efficiency of the compressor station operation by diminishing horsepower requirements.

**The lower deck.**—Fig. 4 shows a view of the heat exchangers on the lower deck. These are American Locomotive units, and include five engine oil coolers, two engine jacket-water coolers, two low-pressure gas coolers (for the compressed gas passing from the first to the second stage of compression), and two high-pressure gas coolers (for the second-stage compressed gas). In addition, standby heat exchangers for the compressed gas have been provided, so that operations need not be completely shut down during maintenance.

The cooling itself is accomplished by pumping bay or marsh water from one side of the barge, through the heat exchanger jackets, and directing the heated discharge water back into the bay at some distance on the other side of the barge.

**Other features.**—Shown in Fig. 5 is another Parkersburg separator which serves as an interstage scrubber for gas returning from the coolers to the second stage of compression. Distillate collected from here and from the other separators on the barge is fed into the storage tanks shown to the left of Fig. 3. Accumulated distillate is later removed by barge.

Fig. 6 illustrates the two gas dehydrator units each having capacity to process 15 million cubic feet of gas daily. These units utilize a dry desiccant (silica-gel type), and while one is being used to remove water from the compressed gas as it feeds into the pipe line, the other is being regenerated.

**The significance.**—No figures have been released as to the sale price of gas delivered to United's pipe line. However, simple arithmetic will show that if the gas is sold for as little as 5 cents per M.c.f., the investment of $500,000 for each barge and gathering system having a 15 million cubic feet daily capacity would be repaid in only a matter of a few years. It may be surmised from other field-gas prices that Gulf and other operators are getting more than 5 cents per M.c.f. of gas.

In any event, the interesting conservation lesson to be drawn from this story is that gas which when it was flared had no value, now assumes significant value because transport to points of utilization has been provided. The key, it seems, is to have sufficient gas reserves to warrant construction of pipe-line facilities. This means the reserves must be located in a particular area or, as in the case of the lower Mississippi Delta fields, the reserves must be found along route which can be connected to pipe-line facilities. Under these conditions, the incentive is great to convert otherwise wasted gas into dollars profit, as witnessed by the activities of Gulf and other producers in the Mississippi Delta fields.

In view of these considerations officials of the Louisiana Conservation Department have good reason to expect that projects recently completed, nearing completion, or scheduled for later completion in 1952 will do much to eliminate future waste of natural gas.

## Sulfur Production From Hydrogen Sulfide

*(Continued from page 159)*

than 20-ton per day capacity economically attractive.

It must be realized that the cost figures presented in this study are highly approximate, and based upon an assumed set of conditions which will seldom be met by any actual project. Variation in feed gas composition or required conversion efficiency will greatly affect the plant cost, and numerous other factors can alter the operating costs given. The data, furthermore, are based upon the conditions at the time of this writing (September 1951). However, it is believed that the information will be of value in providing a general understanding of the economics of producing sulfur from hydrogen sulfide.

Fluor Corp. has recently succeeded to the proprietorship of all patents, process developments, and operating experience resulting from the extensive sulfur plant operations of Mathieson Chemical Corp., and now offers these processes to industry through its customary engineering services. The authors wish to express appreciation to the management of Fluor Corp. for permitting publication of the data contained in this article.

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## BOOKS

LIGHT HYDROCARBON ANALYSIS. Edited by O. W. Burke, Jr., C. E. Starr, Jr., and F. D. Tuemmler. Published by Reinhold Publishing Corp., 330 West Forty-second Street, New York. 639 pp. $15.

This book contains an enormous collection of analytical procedures. Included in an illustrative manner are various schemes of analysis employing these methods for a complete assay of highly complex hydrocarbon mixtures. The book also offers an approach to the presentation of analytical procedures by furnishing information on butadiene manufacturing processes as a background for the development of the methods. The reader will find extensive information on safe practices in the laboratory handling of light hydrocarbons. This arrangement of background, detailed analytical methods, statistical data on accuracy and precision of the methods, and safe practices make this book useful as a working manual for the industrial laboratory as well as for classroom instruction in advanced analytical chemistry.

# Four Ideas That Improved Cities Service's Alkylation Unit Operation

**by F. Lawrence Resen**
Gulf Coast District Editor

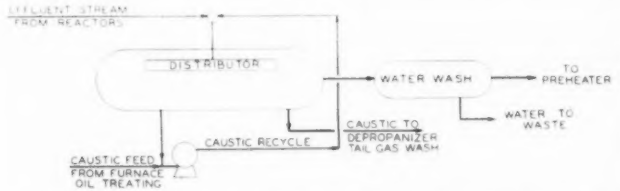
A SERIES of modifications installed in its alkylation units by operating personnel at Cities Service Refining Corp.'s Lake Charles 150,000-bbl. refinery has curtailed shutdowns, improved quality control, and resulted in a savings in operating costs.

An improved caustic wash system has cut down the corrosion and fouling control of acid strengths, and a higher isobutane-olefin ratio is being achieved with a modification between the isobutane tower and depropanizer.

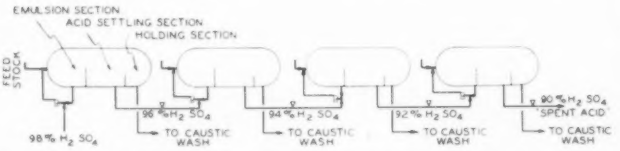
Two sulfuric acid alkylation units are in service at the plant; the "A" unit consists essentially of four reactors in parallel, an isobutane tower, a debutanizer, a rerun tower, and a depropanizer. The "B" unit consists of five reactors in parallel, a debutanizer, and a rerun tower. Feed stocks for the units originate in the cracking units. One cracked stock, which contains normal and isobutane, all of the butylenes, and some propane and pentane contaminants are further processed at the butadiene plant. The normal butylenes are largely removed at the butadiene plant, where in the process isobutylene is converted to its dimer, so that the feed stock returned to the refinery for use in the alkylation unit contains the butanes, diisobutylene, traces of butylenes, and some pentanes. This and a propane-propylene stock are the feed stocks for the units.

**Caustic wash.**—Stock from the reactors is washed with caustic in the caustic wash drum, given a water wash, and then preheated before entering the isobutane tower or the debutanizer.

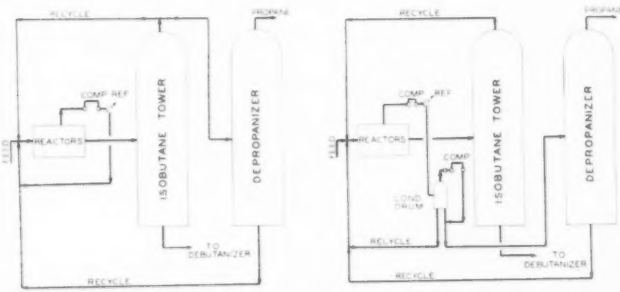
Previously the caustic level in the wash drum was maintained at a definite level and the caustic was recirculated from the settling section into the incoming effluent stream and then into the overhead distributor in the drum. The distributor on the



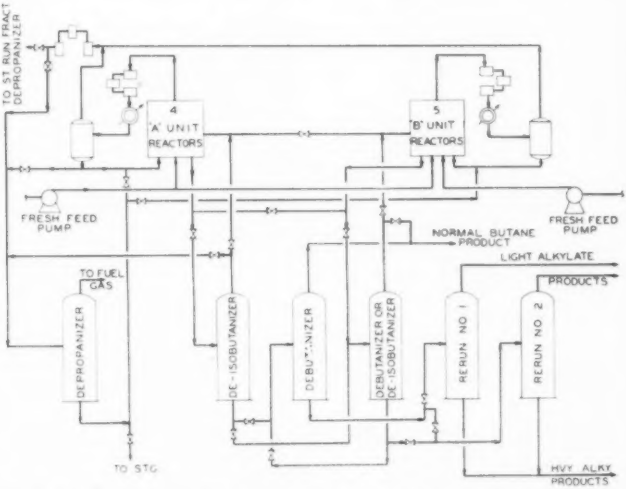

*1—One of the improvements in operation of Cities Service Refining Corp. Lake Charles alkylation units is continuous addition of fresh caustic to the recycle.*




*2—By feeding sulfuric acid in series (partially spent acid from one reactor is fed to the next reactor) closer quality control of the acid has been made possible.*




*3—A higher isobutane-olefin ratio has been achieved by feeding refrigerant condensate to the depropanizer (right) instead of isobutane tower overhead as shown at left.*




*4—Piping tie-in between the two alkylation units at Lake Charles has been designed to keep down the loss of propylene to refinery fuel gas during turnarounds.*

caustic wash system of a set of parallel pipes connected to a common inlet and having a series of holes drilled on the bottom sides so that the caustic is evenly distributed over the drum. Deposits accumulating around the holes in time reduced the effectiveness of the distribution system. When the holes became plugged, fresh caustic either had to be run through to eliminate the clogging, which was a waste of caustic, or else water was used to wash the ports. The water reduced the concentration of the caustic wash so that additional caustic was required to offset the weakening effects of the water. When quality-control tests showed that the caustic had been exhausted for this particular operation, the spent caustic was dumped and a fresh supply of 10-15 per cent caustic included until it, too, had been exhausted.

### Clogged Ports a Drawback

One of the drawbacks to this method was the clogging of ports in the distributor when the caustic would react with the sulfuric acid contained in the effluent from the reactors. Further troubles were experienced in the steam preheater where a high degree of corrosion was being experienced. The unit was being shut down frequently to plug tubes, replace tubes, etc., due to leaks caused by corrosive action.

In place of the batch method of replenishing the caustic supply, a supply of caustic is now continuously introduced into the recycling section of the caustic wash system. This caustic, which has been used once in furnace-oil treating, is added to caustic being recycled from the drum into the distributor system so that a comparatively fresh supply of caustic is entering the distributor. By means of liquid-level controllers the excess of partially spent caustic is withdrawn. After being washed by caustic, the effluent enters the water wash and then proceeds into the steam preheater. The spent caustic is further used to wash overhead gas from the depropanizer for the fuel system; this is in order to offset the corrosive and plugging effects of the exhaust fuel gas which had been adversely affecting the burners.

The new setup has, to date, resulted in the prevention of clogging in the distributor, an apparent decrease in the corrosive effects in the preheater, and a saving in the cost of caustic.

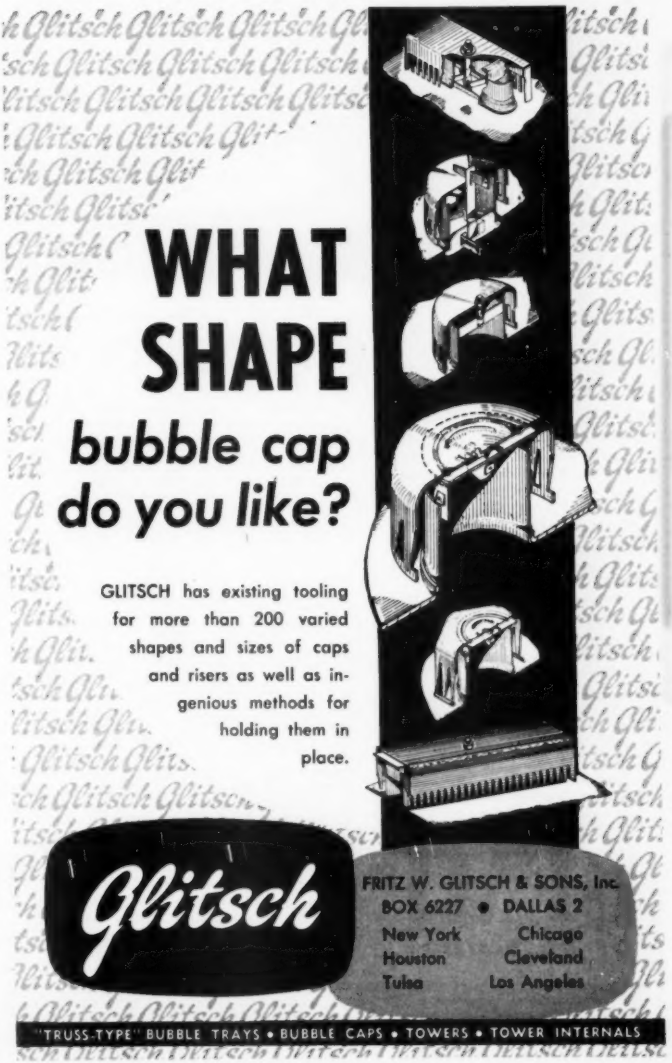
Originally, no bypass had been provided around the preheater so that when the preheater shut down, the rest of the system had to be shut down until the preheater was repaired. A bypass now installed will provide for the shunting of effluent past the preheater during shutdown periods.

**Acid series.**—The four reactors in the "A" alkylation unit are now tied together in their acid supply so that the 98 per cent sulfuric acid is fed to one reactor. The partially spent acid from this reactor is the feed acid for the reactor next in series, and the process is repeated with the third and fourth reactors until the final spent 90 per cent acid is drawn off for use in the "B" unit.

Previously, fresh acid was introduced into each of the reactors in parallel and spent acid taken off each reactor. The control problem in the original setup was four times that now being encountered because of the four separate streams of acid necessary to check through quality control. Under the present setup, acid samples are obtained from the last reactor and these are obtained more frequently than was possible with four reactors being sampled. The acid system is thus controlled at one station. It is possible to concentrate lab service on the last reactor and maintain a closer quality control of acid.

**Condensate feed.**—A higher isobutane-olefin ratio is being achieved with the modification applied between the isobutane tower and the depropanizer in the "A" alkylation unit.

Under the original setup, part of the isobutane overhead product was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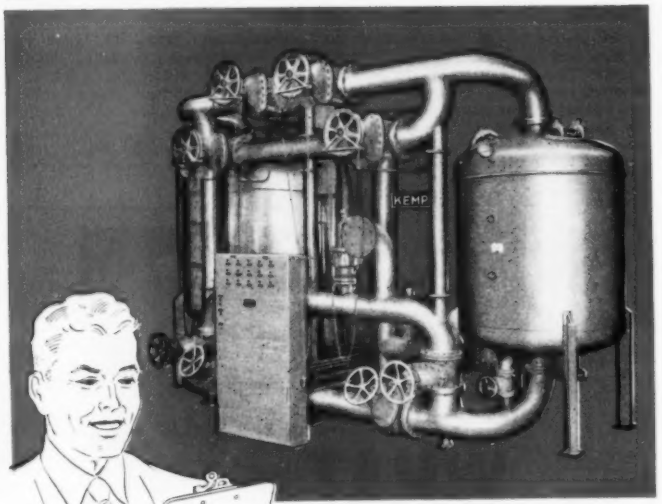

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tapped off to recycle through the reactor and the remainder served as feed to the depropanizer. Vapors from the reactors were compressed and cooled after which they were returned to the reactor to supply auto-refrigeration. After the wartime operations, when $C_3$ alkylation was ceased, more propane-propylene feed was used and a reduction in the amount of propane in the system was desired.

With the present modification, all the overhead from the isobutane tower is cycled back through the reactor. The depropanizer is fed with part of the refrigerant condensate which is much richer in propane. With the use of refrigeration condensate as feed for the depropanizer, the propane content of the isobutane tower overhead has been reduced approximately 35 per cent. The recycle stock thereby contains more isobutane, increasing the internal isobutane to olefin ratio. This also helped a condensation problem on the isobutane tower condensers.

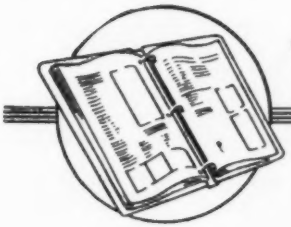
**Unit flexibility.**—After large-scale propylene alkylation was proved feasible and economical, it became desirable to incorporate equipment in the two units so that minimum propylene would be lost to the refinery fuel-gas system during turnarounds. There are no storage facilities for propylene and only limited butane storage.

Maximum propylene alkylation during turnarounds was accomplished by installing sufficient interconnecting lines between "A" and "B" units to spare each piece of equipment having a counterpart in the opposite unit. The installation included a new 6-in. interconnecting line between the two units, a 2-in. feed line from the "A" unit feed pumps to the "B" unit reactors, a 4-in. dry-gas line from the high-stage compressor discharge to the topper gasoline depropanizer, and new feed tank suction piping to improve over-all flexibility. An accompanying figure shows the piping possibilities in and between the two units.

## BOOKS

BOILER FEED WATER TREATMENT. By F. J. Matthews. Published by Chemical Publishing Co., Inc., 26 Court Street, Brooklyn. 207 pp. $4.50.

Purpose of this book, according to the publisher, is to provide the operator of the small "ordinary" plant with some guidance to the wide variety of treatment now available, and with a view to assisting rapid reference and lessening confusion, the information is presented in articulate form. The author first describes the various types of natural waters and their unsuitability for boiler feed. He next deals with the principal operating troubles, giving the older corrective measures first and then showing how their failings have necessitated the development of modern improvements. Finally, there is a section on analysis, including the usual routine methods of testing required for the efficient operation of softeners, etc.



# THE REFINER'S notebook

No. 111

# Selection and Operation of Cooling Towers*

IN concluding a short Refiner's Notebook series on cooling towers, some factors involved in their selection are dealt with.

**Performance factors.** — Cooling-tower design and performance guarantees are based on: (1) a given approach to a specified wet-bulb temperature, (2) a stated cooling range, and (3) given heat load. One of the first problems in design is the selection of a wet-bulb temperature. This may be done by plotting the summer weather data over a period of several years at the plant location. A wet-bulb temperature is often taken which is near the prevailing maximum.

For example, it is common practice to select a wet-bulb temperature which will not be exceeded more than 5 per cent of the time between noon and midnight in an "average" or normal year for the months June to September, inclusive. Usually design wet-bulb temperatures run between 70° and 80° F., with allowance made for type of service as well as geographical location. (The 5 per cent rule may be applied in the selection of design air temperature for dry-surface coolers, but in that case the rule is applied to the **dry-bulb** temperature.)

During the time in a normal year when the wet bulb is actually above that chosen for design, or for operation during an abnormal year, actual tower performance will match the design performance. In the case of cooling towers serving the refinery power plant, this will have an effect on the condenser vacuum and turbine generating capability. If, in an extreme case, a load study should happen to show peak power load during the below-design performance period, a higher wet bulb or closer approach may be justified.

*This summary on cooling towers is taken from papers contributed by the Power Division of A.S.M.E. for a cooling-tower symposium.

### Effect of Closer Approach

In the case of power plants, the heat removed from the condenser circulating water is the latent heat that has been transferred to it from the turbine exhaust stream. The condenser and cooling towers are two heat exchangers whose combined characteristics determine the condenser vacuum at each turbine load. LeBailly[1] has given the example of a 30,000-sq.-ft. two-pass condenser operating with three different cooling towers under the same heat load, wet bulb, and cooling range but with approach design for Tower "A" of 8° F., Tower "B" of 10° F., and Tower "C" of 14° F. Design wet bulb is 77° F. and the cooling range 16.5° F.

Since these cooling towers would actually operate at a wet bulb below the design of 77° F., performance comparison has been made in Fig. 1 for tower operation at different wet bulbs from 45° to 77° F. The comparison is made from the viewpoint of the power-plant engineer, namely on the basis of fuel consumption. The savings in B.t.u. per kilowatt-hour is 27 when going from the 14° to the 10° approach and 36 when going from the 14° to the 8° approach at the wet bulb of 45° F. which corresponds to the annual average wet-bulb temperature for a Midwest location.

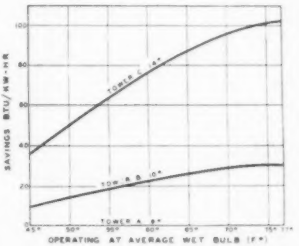



*Fig. 1—Savings in fuel requirements for a condensing turbine installation obtained with an 8° F. approach design over a 10° F. and 14° F. approach when operating at different wet bulb temperatures below the design wet bulb of 77° F. Cooling range is 16.5° F.*

**Checking performance.**—After towers are placed in service it may be desired to test them initially as a check against design performance. Conditions for the actual installation may be different from those specified in the design. It may be possible to obtain correction curves from the manufacturer.

Before installation is made, the location, spacing, and orientation of the cooling towers is considered. Recirculation of the hotter air discharging from the tower back into the tower inlet may take place. While it is generally agreed that the induced-draft tower is superior to the forced-draft with regard to recirculation tendency, questions as to how much better it is and what are the fan power requirements for the two types of towers still continue to be debated.

General rules on location are that towers should be 300 to 500 ft. from the process units or power plant, main roadways, or power lines. To minimize tendency toward recirculation, the tower is usually located with longitudinal axis parallel to prevailing summer wind. Hiebeler[2] reports observations on towers so oriented in the Houston area. The leeward tower still showed 1° to 2° F. poorer approach to the wet bulb than the windward unit. Hiebeler also reported on operating experience with different types of fans, an important item in reliable cooling-tower operation.

### References

Papers presented at the 1951 Atlanta, Ga., meeting of the A.S.M.E.:

1. "Economic Factors in Selection of Cooling Towers," A. R. LeBailly.
2. "Operating Experience With Cooling Towers. . .," H. G. Hiebeler.
3. "Cooling Towers for Steam-Electric Stations," Louis Elliott.
4. "Recirculation in Cooling Towers," Joseph Lichtenstein.

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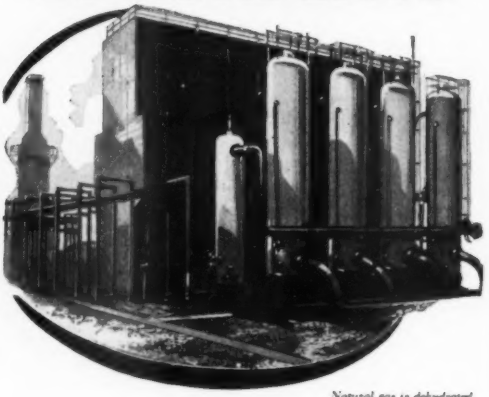

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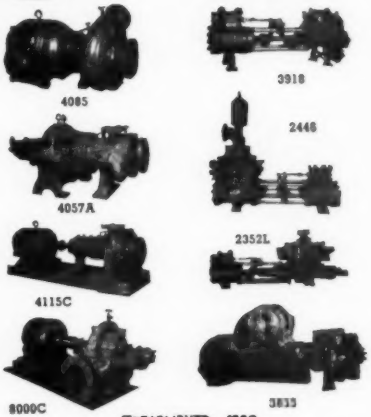


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# QUESTIONS on TECHNOLOGY

**by W. L. Nelson**
Consulting Engineer

## Yields in Noncoking Thermal Cracking

**Although thermal cracking has been practiced for many years we do not know of formulas for computing the yields. Can you direct us to literature on this subject? S. C.**

The only published methods of obtaining yields that are known to this department are the charts published in "Factors Affecting the Yield in Thermal Cracking" by George Armistead in The Oil and Gas Journal of May 17, 1947, the equations of gas yield and gasoline published on page 576 of the third edition of Petroleum Refinery Engineering (McGraw-Hill Book Co., Inc., New York, 1949) and the very early article by the author of this page in the Petroleum Engineer of August 1933 (Cracking—Plant Design). Theoretical or mathematical analyses were also attempted by S. A. Kiss, "Distillate Yields in Cracking," Industrial Engineering Chemistry, Vol. 22, January 1930, and by K. Luts, "Prediction of Motor Fuel Yields. . .," The Oil and Gas Journal, September 29, 1932, p. 20.

It is indeed noteworthy that such an important consideration has been neglected. Accordingly, over 50 references regarding cracking-plant operations were examined, and data representing the operations of more than 400 cracking-plant runs were correlated with the results shown on this page. Yields of 400°-end point 10-lb. R.v.p. gasolines are shown in Fig. 1 as a function of the degree of degradation that the feed stock undergoes as it is being reduced to cracked fuel. A.P.I. gravity is used as the measure of the degree of degradation. The yield of gas (volume per cent unaccounted for) is represented with fair accuracy by:

Per cent unaccounted = $0.5\ (A_s - A_r)$

in which

$A_s$ = A.P.I. gravity of charge stock
$A_r$ = A.P.I. gravity of cracked fuel

**TABLE 1—APPROXIMATE GAS AND UNACCOUNTED FOR LOSSES IN THERMAL CRACKING**

| A.P.I. of charge stock minus A.P.I. of fuel | Vol. % "unaccounted for" |
|---|---|
| 2 | 0 |
| 5 | 1.4 |
| 10 | 4.0 |
| 15 | 6.7 |
| 20 | 9.5 |
| 25 | 12.5 |
| 30 | 15.7 |
| 35 | 20.0 |

A somewhat more accurate tabulation of gas losses is given in Table 1. However, great variations in "unaccounted for" losses are reported. The cracking of distilled charge stocks (gas, oil, etc.) appears to yield slightly more gas than the cracking of residual stocks.

The amount of fuel oil that is produced can be obtained by subtracting the gasoline and the "unaccounted for" loss from 100.

The following facts or relationships are evident from the correlation:

1. **Kind of stock.**—Residual stocks such as topped crude oil, reduced crude oils, or residuums, yield the same amount of gasoline as distilled stocks such as gas oils, distillates, or kerosines, when degraded by the same change in A.P.I. gravity. No difference could be detected when plotting data on distillate or residual charge stocks. Thus, when a 25° A.P.I. gas oil is cracked to produce a 6° A.P.I. fuel oil, the yield of gasoline is the same as when cracking a 25° A.P.I. topped crude into a 6° A.P.I. fuel oil.

2. **Most mild cracking.** — When cracking most mildly, i.e., when the gravity of the fuel oil is substantially the same as that of the charge stock, no gas or unaccounted-for loss occurs. In fact, the liquid volume of gasoline and cracked fuel oil derived from the process may exceed 100 per cent. Under these same conditions, the gravity of the cracked fuel oil may be higher than that of the charge stock. Thus, when viscosity breaking a 10° A.P.I. residuum for the production of only 8 per cent of gasoline, the cracked fuel oil may have a gravity of 10.5° A.P.I., and no loss occurs.

3. **Severe cracking.** — During mild cracking the yield of gasoline is increased by about 3 per cent for each reduction of 1° in the gravity of the fuel oil. This occurs when the charge stock is degraded by only 0°-10° A.P.I. Under severe cracking conditions, that is when a 20°-40° A.P.I. stock is cracked to produce a fuel oil that has a gravity of only plus 5 to minus 5, the yield of gasoline is scarcely increased at all by further reduction in the fuel oil gravity. In fact, a decrease in gasoline yield is sometimes encountered. This is particularly evident with very light charge stocks such as naphthas or kerosines. With these stocks, increase in the intensity of cracking results in lower and lower yields of gasoline. This relationship is indicated in Fig. 1 for the right-hand ends of the curves, and particularly for charge stocks which have a gravity of 45°-55° A.P.I. The same results have been reported for viscosity-breaking operations or in the preparation of charge stocks for catalytic cracking but the author has never seen direct evidence of this phenomenon in the cracking of heavy (below 25° A.P.I.) charge stocks.

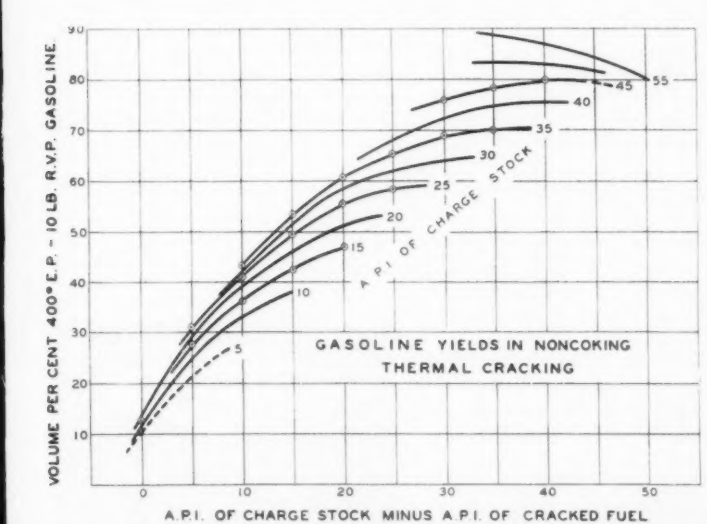


**Fig. 1—Average yields of gasolines obtained in more than 400 cracking-plant operations when cracking straightrun stocks and with no deliberate coke formation.**

Announcement

# MAGNESIUM ANODES

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*Magnesium Department*

**THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN**

# Pipe-Line Construction

FOLLOWING is a tabulation of pipeline projects which are planned or under construction. Included are crude-oil, products, and natural-gas lines. This list is compiled from surveys made by The Oil and Gas Journal.

### Crude-Oil Pipe Lines

**Continental Pipe Line Co.**—105 miles, 8-in., authorized, Rincon to northwest of Sullivan City on to Port Isabel, Tex. Completion date 1952.

**Continental Pipe Line Co.**—217 miles, 12-in., authorized, Wichita Falls, Tex., to Ponca City, Okla. Completion date 1952.

**Interstate Oil Pipe Line Co.**—33 miles, 20-in., authorized, Bunkie to Melville, La. Completion date 10-52.

68 miles, 16-in., authorized, Raceland to Anchorage, La. Completion date 10-52.

18 miles, 12-in., authorized, LaRose to Raceland, La. Completion date 10-52.

47 miles, 16-in., authorized, Sunset to Anchorage, La. Completion date 7-52.

**Mid-Continent Pipe Line Co.**—23 miles, 4-2-in., under way, Elmore City to Velma, Okla. C. P. Carter Const. Co. Gus Bowman, spreadman at Duncan, Okla. Completion date 3-1-52.

**Ohio Oil Co.**—117 miles, 22-in., under way, Sheridan, Ind., to Lima, Ohio. R. A. Conyes, contractor.

**Pan American Pipe Line Co.**—27 miles, 26-in., Genoa to Texas City, Tex. Completion date 12-52.

**Pan American Pipe Line Co.**—40 miles, 14-in., Arden Station in Irion County to Eldorado Station in Schleicher County. 6-52.

**Platte Pipe Line Co.**—1,075 miles, 16-20-in., under way, Worland, Wyo., to Wood River, Ill. Completion date 1952.

**Platte Pipe Line Co.**—573 miles, 16-20-in., under way. Winchester, Wyo., to Brule, Neb. R. H. Fulton & Co. (Sections 1, 2, 3, and 4.—Section 1, 125 miles of 16-in., remainder 20-in.) A. A. Carrigan, spreadman at Wheatland, Wyo., field office.

**Platte Pipe Line Co.**—142 miles, 20-in., contracted, near Marysville, Kans., to Holdredge, Neb. Bishop & Lock (Section 5); H. LaQuey, spreadman.

**Platte Pipe Line Co.**—100 miles, 20-in., contracted, northern edge of Kansas. Rumsey Bros., contractor of Section 6.

**Platte Pipe Line Co.**—(Section 7). 274 miles, 20-in., Missouri River to Salisbury, Mo., and (Section 8) Salisbury to Mississippi River, under way. O. R. Burden Construction Co., field office, Mexico, Mo.; B. C. Hall, spreadman; river crossing field office, Hartford, Ill., Dick Jernigan, spreadman.

**Progress Pacific Pipe Line Co.**—900 miles, 20-in., proposed, Permian basin, West Texas, to California.

**Rancho Pipe Line System.**—455 miles, 24-in., authorized, McCamey to Houston, Tex. Completion date late 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., Phillips Pipe Line Co., and Ashland Pipe Line Co., with Shell Pipe Line Corp handling construction and operation.

**Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., authorized, St. Helens to Norwich, Mich.

**Service Pipe Line Co.**—28 miles, 20-in., looping, authorized; Drumright, Okla., to Humboldt, Kans. G. G. Griffis Const. Co., contractor. E. G. Grisham, spreadman at Drumright.

**Shell Pipe Line Co.**—42 miles, 8-in., authorized, Hallettsville to LaGrange, Tex. Completion date 7-1-52.

**Shell Pipe Line Corp.**—66 miles, 8-in., authorized, Gohlke to La Grange, Tex. Company crews. Completion date 1952.

**Sinclair Pipe Line Co.**—674 miles, 22-24-in., authorized; Drumright, Okla., to E. Chicago, Ind. Completion date 1952.

(Section 1).—150 miles, 24-in., contracted, Drumright-Cushing, Okla., area, to Humboldt, Kans. O. R. Burden Construction.

**Skelly Oil Co.**—38 miles, 8-in., under way, Lyons to Burrton, Kans. Rumsey Bros., contractor. Completion date 1-52.

**Texas Pipe Line Co.**—319 miles, 22, 12, 10-in., Louisiana Gulf Coast to Port Arthur, Tex., including 220 miles, 22-in., Houma, La., to Port Arthur, Tex.; 31 miles, 12¾-in., Houma to Cocodrie, La. Houston Contracting Corp. Completion date in summer 1952.

**Toronto Pipe Line Co., Shell Pipe Line Corp., and Texas Pipe Line Co.**—52 miles, 12-in., 10 to 12 miles, 10-in., 10 miles, 6-in., planned, Sterling, Colo., to connection with Platte Pipe Line at Gurley, Neb.

**West Texas Gulf Pipe Line Co.**—471 miles, 26-in., contracted, Colorado City to Wortham, Tex., 26-in.; Wortham to Sour Lake—Tex., 24-in. Completion date 10-52.

**West Texas Gulf Pipe Line Co.**—114 miles, 20-in., contracted, Wortham to Longview, Tex. Completion date 10-52.

**West Texas Gulf Pipe Line Co.**—44 miles, 26-in., under way, Glenrose, Tex., area. Anderson Brothers, contractor.

### Products Pipe Lines

**Bell Oil & Gas Co.**—150 miles, 6-in., planned, Ardmore to Drumright, Okla. (Includes 114 miles, 8-in.; 32 miles, 6-in.)

**Buckeye Pipe Line Co.**—370 miles, 8, 12, 16-in., authorized, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y. (Sections divided as follows: 75 miles, 16-in., 218 miles, 12-in., 77 miles, 8-in.) Start 1952, completion of 16-in., 1953, balance 1953.

**Ohio Oil Co.**—24 miles, 8-in., authorized, East St. Louis to Wood River, Ill.

**Phillips Oil Co.**—28 miles, 12-in., authorized, Sweeny to Freeport, Tex. Completion date 3-52.

**Phillips Pipe Line Co.**—42 miles, 10-in., under way, Green Ridge to Villa Ridge, Mo. Mid-States Const. Co. T. H. Edmonds, superintendent at Sedalia, Mo.

34 miles, 8-in., under way, Kanakee, Ill., to Dyer, Ind. Somerville Const. Co. O. P. Hiner, spreadman at Kankakee. Completion date 3-15-52.

**Phillips Pipe Line Co.**—68 miles, 12¾-in., under way, Osawatomie westward to Wichita, Kans. Brown Lite Co. R. E. Carriker, spreadman at Osawatomie, Kans.

40 miles, 10-in., through Monteau, Cole, Osage, and Gasconade counties, Missouri, Trojan Const. Co. E. L. Maggard, spreadman at Linn, Mo.

Under way, Paola, Kans. - Harrisonville, Mo., Smith Contracting Corp.

74 miles, 8-in., under way, looping from Decatur, Ill., to East Chicago, Ind. Somerville Const. Co., contractor.

137 miles, 10-in., authorized, looping from Paola, Kans., to East St. Louis, Ill.

**Progress Pacific Pipe Line Co.**—900 miles, 10-in., proposed, California to West Texas

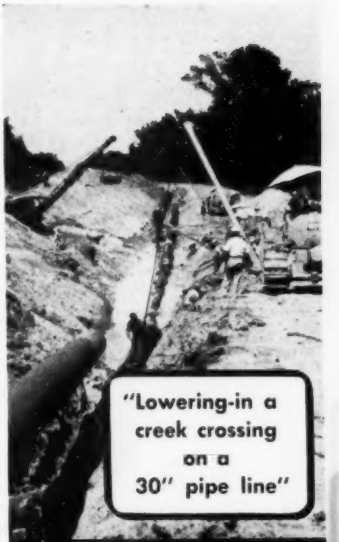
**Salt Lake Pipe Line Co.**—Proposed, Pasco, Wash., to Puget Sound.

**Shell Oil Co.**—565 miles, 8-14-in., planned, Wood River via East Chicago to Detroit; 35 miles, 14-in. Completion date summer of 1952.

**Sinclair Pipe Line Co.**—8-in., proposed. Sinclair, Wyo., to Salt Lake City, Utah; 10-in., Houston to Baton Rouge; 16-in., Kalamazoo to Detroit; 20-in. Marcus Hook to Bayonne, N. J.; East Chicago to South Bend, Ind.

**Socony-Vacuum Oil Co., Inc.**—175 miles, 6-8-in., under way, Augusta, Kans., to Kansas City, Mo. Ray L. Smith & Son, Inc. (Spreadmen are located as follows: Dewey Whitworth at Topeka, Kans.; Carl Samuel Colvin at Burlingame, Kans.; George Kelpar at Topeka, Kans.; Clark Liggett, Tonganoxie, Kans.) Completion date 1-1-52.

**Standard Oil Co. (Ind.).**—122 miles, 8-in.,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under way, Neodesha, Kans., to Belton, Mo. Bills & Troth Construction Co., Carl Bills, superintendent, at Armory Building, Neodesha. Completion date 1952.

**Standard Oil Co. (Ohio).**—17 miles, 6-in., authorized, Toledo to West Toledo, Ohio.

**United States Pipe Line Co.**—1,000 miles, proposed, Gulf Coast via Memphis, Nashville, Tenn., Lexington, and Paducah, Ky., to Cincinnati, Ohio.

## Natural-Gas Pipe Lines

**Allied Gas Co.**—24 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

**Amere Gas Utilities Co.**—16 miles, 8⅝-in., proposed, loops from Mercer County to Princeton, W. Va.

**Amere Gas Utilities Co.**—15 miles, 8⅝-in., proposed, near Dameron to Flat Top, W. Va.

**Associated Natural Gas Co.**—88 miles, authorized, Missouri.

**Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

**Cities Service Gas Co.**—179 miles, 4-30-in., gathering system in vicinity of Ulysses, Kans. Vaughn & Taylor Const. Co., Inc. D. D. Vaughn, spreadman, Ulysses.

21 miles, 26-in., proposed, Franklin and Anderson counties, Kansas.

15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

**Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

**Colorado Interstate Gas Co.**—250 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor. Jerry Nash, spreadman at Lamar, Colo.

16 miles, 4-in., Pueblo County to Fowler, Colo.

**Commonwealth Natural Gas Corp.**—537 miles, 20-in., proposed, West Bend, Ky., to Norfolk, Va.

**Cumberland and Allegheny Gas Co.**—46 miles, 10-in., authorized, Mountain Lake Park, Md., to Preston County, W. Va.

**Dow Chemical Co.**—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich.; Mahoney Contracting Co., contractor, Ralph Bucher, spreadman at Midland.

**East Tennessee Natural Gas Co.**—172 miles, 22-in., authorized, Greenbrier to Oak Ridge, Tenn.

**East Tennessee Natural Gas Co.**—100 miles, 16-in., proposed, Knoxville to Kingsport, Tenn.

**El Paso Natural Gas Co.**—122.9 miles, 30-in., proposed, looping along main line in Texas, New Mexico, Arizona.

**Equitable Gas Co.**—17 miles, 16-in., under way, near Pittsburgh. H. L. Gentry Const. Co., contractor. Lavern Curtis, spreadman at Sewickley, Pa.

**Georgia Gas Co.**—32 miles, 4½-in., proposed, Bogart to Gainesville, Ga.

**Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

**Glacier Gas Co.**—120 miles, 16-in., proposed, Spokane to Hanford, Wash.

**Glacier Gas Co.**—91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

**Glacier Gas Co.**—130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

**Grand Valley Pipe Line Co.**—105 miles, 8-10-in., planned, Piceance Creek field to Rifle on to Grand Junction, Colo.

**Gulf Michigan Transmission Corp.**—680 miles, 30-in., proposed, Perryville, La., across Arkansas, Missouri, and Illinois to terminus near St. John, Ind.

**Home Gas Co.**—17 miles, 12-in., proposed, loops from Hancock to Sanford, N. Y.

**Iowa-Illinois Gas & Electric Co.**—41 miles, 10-in., authorized, Washington County to Cedar Rapids, Iowa.

¾ to 6-in., under way, Davenport, Iowa, and Moline, Ill. C. E. Wilson Const. Co.

**Kansas-Nebraska Natural Gas Co., Inc.**—179 miles, proposed, Kansas and Nebraska.

40 miles, 6-in., under way, Albion to Norfork, Neb. Jayhawk Const. Co., Inc., contractor; F. A. Faler, spreadman at Albion.

30 miles, 6-in., under way, Albion to Neligh, Neb. Jayhawk Const. Co., Inc., F. A. Faler, spreadman at Albion.

60 miles, 8-10-12-in., under way, Grand Island to Albion, Neb.

65 miles, 2-8-in., authorized, Big Springs field to Ogallala, Neb., and to Ovid, Colo.

39 miles, 4 and 6-in., planned, Neligh to O'Neill, Neb., 54 miles, 4 and 6-in. planned, Neligh to Hartington, Neb. (extension). Completion date 1952.

**Kansas Power & Light Co.**—27 miles, 20-in., authorized, Pratt, Kans., to Calista compressor station.

**Lake Shore Pipe Line Co.**—45 miles, 10¾-in., authorized, northwesterly from T.G.T. system near Meadville, Pa., to Ashtabula, Ohio.

**Michigan Gas Storage Co.**—93 miles, 16-22-24-in., under way, Laingsburg to near Pontiac and Mount Clemens, Mich. (Includes 17 miles of lateral lines.) Mahoney Contractor. Completion date 6-52.

**Michigan Gas Storage Co.**—30 miles, 26-in., authorized, looping between Laingsburg and Mount Pleasant Junction, Mich.

**Michigan Gas Utilities Co.**—77 miles, under way, Sturgis, Hillsdale, and Coldwater, Mich. (22.7 miles, Marshall south to Coldwater; 20 miles, Coldwater easterly to Hillsdale; 22.5 miles, Hillsdale to Sturgis; 11 miles, Hillsdale to Jonesville.) Somerville Const., contractor. Jim Godwin at Coldwater.

**MidSouth Gas Co.**—240 miles, proposed. Greene, Poinsett, Crittenden, St. Francis, Lee, Phillips, Monroe, Woodruff, and Cross counties, Arkansas.

**Mississippi River Fuel Corp.**—98 miles, 16- and 18-in., authorized, feeder line from Lincoln Parish, Louisiana, to Waskom field, Harrison County, Texas.

**Mississippi River Fuel Corp.**—40 miles, 18-in., authorized, Dubach to Perryville, La.

**Missouri Central Gas Co.**—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

**Montana Power Co.**—52 miles, 16-in., authorized, Canada-Montana border to Cut Bank, Mont.

**National Utilities Co. of Michigan.**—76 miles, 20-in., proposed, South Central Michi-


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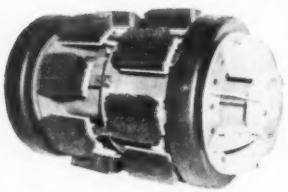
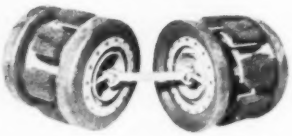


GP-2 16"-30"
Similar design 10" to 14" sizes. Will traverse all standard pipe-line gate valves and field bends of approx. 12 ft. radius.



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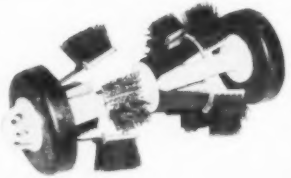

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gan. (22 miles from near Marshall south to Coldwater; 20 miles east to Hillsdale; 22 miles southwest to Sturgis; 5 miles from Hillsdale to Jonesville and 6 miles west to Union City.)

**New River Gas Co.**—50 miles, planned, Summers or Monroe counties, West Virginia to Narrows and Dublin, W. Va.

**New York State Natural Gas Corp.**—66 miles, 20-in., proposed, looping on Westmoreland, Armstrong, and Tioga counties, Pennsylvania. (Includes 17 miles, 16-in. in Potter County, Pennsylvania, and 21 miles 14 in., replacement in Line No. 507, New York.)

**Niagara Mohawk Power Corp.**—55 miles, 10-in., Fulton to Watertown, N. Y.; Williams-Austin Co., contractor, Howard Bauer, supt. Completion date 9-52.

**Northeastern Gas Transmission Co.**—221 miles, 20-24-in., authorized, New Hampshire, Massachusetts, and Connecticut.

**Northeastern Gas Co.**—411 miles, proposed, New England towns.

**Northern Natural Gas Co.**—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

**Northern Natural Gas Co.**—370 miles, 4-26-in., authorized, gathering lines in Hugoton field.

**Northern Natural Gas Co.**—210 miles, 26-in., proposed, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

**Northern Natural Gas Co.**—181 miles, 4-12-in., contracted, gathering system in Hugoton area. Reese Bros. Const., contractor. Completion date in spring.

**Northern Indiana Fuel & Light Co.**—33 in., authorized, Perryville Station, La., to Boeuf River.

**Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

373 miles, 24-in., proposed, Eastport, Idaho, to Monroe, Wash.

79 miles, 18-in., proposed, Monroe to International boundary near Lynden, Wash.

29 miles, 22-in., proposed, Monroe to near Seattle, Wash.

164 miles, 20-in., proposed, Seattle to Portland, Ore.

**Ohio Fuel Gas Co.**—31 miles, 20-in., proposed, Licking County to Richland County, Ohio.

25 miles, 20-in., under way, Xenia, Ohio. Sheehan Pipe Line Const. Co. Earl Williams, spreadman at Xenia. Completion date 2-1-52.

22 miles, 16-in., authorized, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., authorized, Wellington to Elyria, Ohio; 16 miles, 20-in. authorized, Benton Station to Crawford Station. Completion date 11-15-51. 18 miles, 20-in., Crawford Station to near Columbus. Completion date 12-31-51. 16 miles, 16-in., authorized, Berlin to Sandusky, Ohio. Completion date 12-31-51.

74 miles, 3 to 20-in., authorized, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., authorized, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, authorized northern and southwestern Ohio.

**Oklahoma Natural Gas Co.**—14 miles, 8⅝-in., under way, Shamrock to Cushing, Okla.; 21 miles, 24-in., under way, Depew to Kellyville, Okla. Completion date 1-15-52. 9 miles, 12¾-in., Stroud to Depew, Okla. 26 miles, 12-in., under way, Ringwood to Enid, Okla. Completion date 3-15-52.

**Pacific Gas & Electric Co.**—44 miles, 8-in., under way, Salinas to King City, Calif. W. A. Tyler, contractor. Completion date 1953.

**Pacific Gas & Electric Co.**—141 miles, 34-in., proposed, parallel sections along Topock-Milpitas line.

**Pacific Gas & Electric Co.**—10 miles, 10-12-in., authorized, Monterey to Fort Ord to Castroville; 12 miles, 16-in., Napa Wye to Shellville; 6 miles, 12-in., Cotati to Santa Rosa, Calif.

**Pacific Northwest Pipe Line Co.**—400 miles, 22-in., gathering lines on Texas Gulf Coast to Pacific Northwest pipe line.

**Pacific Northwest Gas Pipe Line Corp.**—1,175 miles, planned, Wharton County, Texas, via Oklahoma, Kansas, Fort Collins, Colo., to Portland, Ore., Tacoma and Seattle, Wash.

**Panhandle Eastern Pipe Line Co.**—70 miles,


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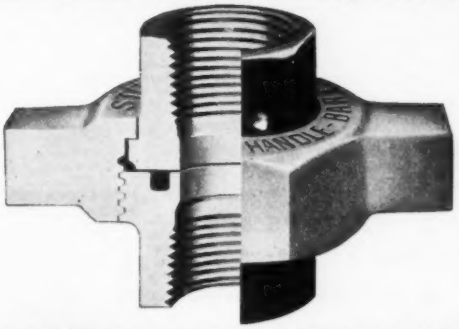


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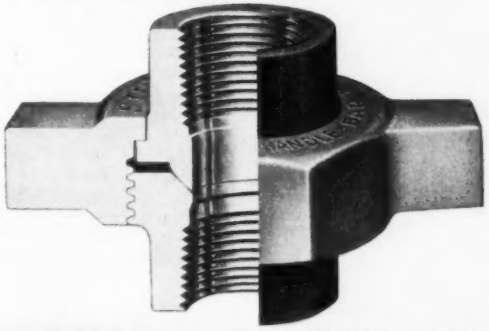

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24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

**Panhandle Eastern Pipe Line Co.**—174 miles, 30 and 26-in., contracted, Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor. 44 miles, 26-in., Edgerton, Mich.; Anderson Bros.; 22 miles, 30-in., looping in Tuscola, Ill.; 45 miles, 30-in., looping in Montezuma, Ind.; 63 miles, 30-in., looping in Zionsville, Ind.

**Pennsylvania Gas Co.**—52 miles, 12-in., between Warren and Erie, Pa. (Section 1—27 miles, under way and contracted by Harford Bros. Section 2—25 miles.

**Peoples Natural Gas Co.**—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

**Phillips Petroleum Co.**—118 miles, 3-22-in., under way, Sherman and Hansford counties, Texas, gas-gathering system; Vaughn & Taylor Construction Co., Inc., Dumas, Tex., J. F. Crawford, spreadman at Texhoma, Okla.

**Prince George's Gas Corp.**—20 miles, 22-in., authorized, between Chillum and Rockville, Md.

**Public Service Co. of North Carolina.**—33 miles, 10-in., authorized, Burlington to Chapel Hill, N. C., completion date 3-1-52; 16 miles, 8-in., authorized, Chapel Hill to Raleigh, N. C., completion date 7-1-52; 29 miles, 4-in., authorized, Statesville to Kanapolis, N. C., completion date 7-1-52; 83 miles, 8-in., authorized, Kings Mountain to Asheville, N. C., completion date 3-1-53.

**Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

**Southern California Gas Co.**—35 miles, planned, Antelope Valley, California.

**Southern California Gas Co. and Southern Counties Gas Co. of Calif.**—45 miles, 30-in., proposed, looping on line from Arizona border to Los Angeles.

**Southern California Gas Co. and Southern Counties Gas Co. of California.**—81 miles, 30-in., proposed, Whitewater to Desert Center, Calif.

**Southern Natural Gas Co.**—21 miles, 24-miles, 8-in., proposed, Edgerton to Auburn, Ind.

**Southern Natural Gas Co.**—14 miles, 24-in., authorized, Onward Station, Miss., to Big Sunflower River.

**Southern Natural Gas Co.**—14 miles, 14-in., authorized, Perryville Station, La., to Wilhite Gate.

**Southern Natural Gas Co.**—375 miles, 24-in., planned, Gwinville, Miss., to Atlanta, Ga.

**Southern Natural Gas Co.**—169 miles, proposed loops, Ouachita Parish, Louisiana, to Augusta, Ga.; 20 miles in Ouachita Parish, 33 miles in Ouachita and West Carroll parishes; 7 miles, Sharkey County, Mississippi; and 108 miles, 14-in., Bass Junction to Augusta, Ga.

**Southern Union Gas Co.**—21 miles, 20-in., authorized, Albuquerque, N. M.

27 miles, 10-in., authorized, Lea and Eddy counties, New Mexico.

30 miles, 12-20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

**Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

**Sunray Oil Corp.**—133 miles, 3-30-in., under way, system for Snyder gasoline plant. Vaughn & Taylor Construction Co., contractor. D. D. Vaughn, spreadman.

**Tennessee Gas Transmission Co.**—591 miles, 24-30-in., proposed, looping along present system (consisting of 323 miles of 30-in.; 167 miles of 26-in.; 101 miles of 24-in.)

420 miles, 30-in., Texas, La., Ark., Miss., Tennessee, and Kentucky.

101 miles, 26-in., Kentucky and Ohio.

304 miles, 24-in., proposed, Mercer, Pa., to Utica, N. Y.

250 miles, miscellaneous laterals.

**Texas Eastern Transmission Corp.**—791 miles, 30-in., under way, Kosciusko, Miss., to Connellsville, Pa.

(Section 1 and 2) 163 miles, 30-in., under way, Kosciusko, Miss., to Florence, Ala. Williams Bros.-Davis Co.

(Section 3) 76 miles, 30-in., Florence, Ala., to Columbia, Tenn. Eastern Pipe Line Contractors.

(Section 4) 73 miles, 30-in., under way, Columbia, Tenn., to Cumberland River. H. B. Zachry Co. A. Vaughn superintendent at Lebanon, Tenn. Completion date 12-10-51.

(Section 5) 79 miles, 30-in., under way, Cumberland River to Columbia, Ky. Oman Const. Co. William Smith, superintendent and Floyd Hudnell, spreadman at Columbia, Ky.

(Section 6) 82 miles, 30-in., under way, Columbia, Ky., to Boonesboro, Ky. N. A. Saigh Co.

(Section 7) 100 miles, 30-in., under way, Kentucky River to Ohio River, northeastern Kentucky. Mahoney Const. Co.

(Section 8) 77 miles, 30-in., under way, Portsmouth to Amesville, Ohio. Anderson Bros. Corp.

(Section 9) 74 miles, 30-in., under way, Amesville to Ohio-West Virginia river crossing. Anderson Bros. Corp.

(Section 10) 66 miles, 30-in., under way, Ohio River to Connellsville, Pa. Anderson Bros. Corp.

**Texas Eastern Transmission Corp.**—50 miles, 30-in., under way, Ohio River to Vanceburg, Ky. Trojan Construction Co., Inc., contractor. Charles Tillotson, spreadman at Morehead, Ky.

**Texas Gas Transmission Corp.**—35 miles, 12-in., authorized, Slaughters, Ky., to Evansville, Ind.

**Texas Gas Transmission Corp.**—189 miles, 26-in., authorized, Acadia Parish to connection with existing facilities in Morehouse Parish.

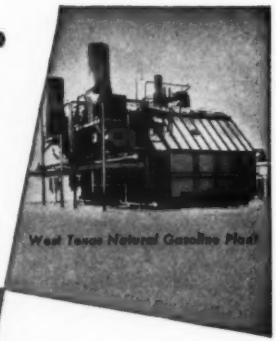
**Texas Gas Transmission Corp.**—195 miles, 26-in., proposed, Gulf Coast region to southwestern Louisiana.

**Texas Gas Transmission Corp.**—425 miles, 26-in., authorized, looping from Bastrop, La., to Hardinsburg, Ky.

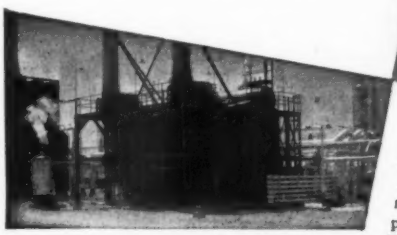
**Texas Gas Transmission Corp.**—181 miles, 26-in., under way, Bastrop to Eunice, La.,


# WICKES

**STEAM GENERATORS SPEED PROCESSING AND CUT COSTS IN REFINERIES AND NATURAL GASOLINE PLANTS**

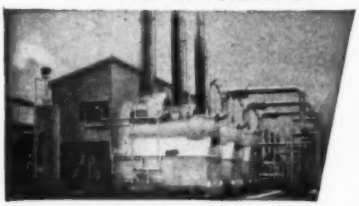


*West Texas Natural Gasoline Plant*



*Central Texas Natural Gasoline Plant*

The Wickes Type A Steam Generator is proving itself one of the most serviceable boiler units employed by the oil and gas industry. Wickes can fill your exact requirements for boilers of any type up to 250,000 lbs. steam per hour and 850 p.s.i. Wickes service facilities are world-wide and our knowledge of steam generation is available to you without obligation. Write for descriptive literature on the famous Wickes line of steam generators.



*Louisiana Refinery*

*Indiana Installation*

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134

Houston Contracting Co. (North spread near Beekman, 65 miles south to Grayson La., W. H. Hayes, supt.; center spread north side of Red River at Pineville, 6 miles north to Grayson, E. C. Norris, supt. south spread, south side of Red River, 5 miles south to Tepetate field near Eunice F. A. Silar, supt.)

**Texas Gas Transmission Corp.**—580 miles 26-in., proposed, Louisiana and Kentucky

**Texas-Ohio Gas Co.**—1,350 miles, 30-in. authorized, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 6-30-53.

**Union Oil Co. of California.**—40 miles 8-10-in., planned, San Joaquin Valley and Los Angeles Basin.

**United Fuel Gas Co.**—32 miles, 20-in. under way, Lanham to Broad Run, W. Va. H. L. Gentry Construction Co., contractor Frank Morris, spreadman at Charleston W. Va.

**United Gas Pipe Line Corp.**—315 miles 24-30-in., contracted, Agua Dulce to near Goodrich, Tex. Oklahoma Contracting Co. contractor. Panama Shiflett, spreadman El Campo, Tex.; Ray Law, spreadman Victoria, Tex.

**United Gas Pipe Line Co.**—510 miles, 2 to 30-in., under way, Agua Dulce, Tex., to Monroe, La. River Const. Corp., contractor

(Spread 1) 51 miles, 30-in., from Pearl River north and south of Jackson, Miss Red Tatom, supt., at Jackson.

(Spread 2) 45 miles, 30-in., McComb to Pearl River south of Jackson. Merle Tatom supt., at Hazelhurst.

(Spread 3) 30 miles, 30-in., Kosciusko south toward Jackson. Jimmy Reed, supt. at Kosciusko.

(Spread 4) 29 miles, 12-in., Lafayette to Jeanerette, La. Roy Earnhart, spreadman at Jeanerette.

(Spread 6 and 7) 97 miles, 20-24-26-in. under way, Houston to Dupont's Sabine River Works, Orange, Tex. Barney Hall supt., at Port Arthur.

(Spread 6) 20 miles, 20-in., under way Orange to Port Neches, Tex. (This spread to move on to Trinity River and work toward Houston). Banty Traweek, spreadman

(Spread 7) 20-26-in., under way, Port Neches to Fannett, Tex. (This spread will continue on to Trinity River). Borger Rec McMenamy, spreadman.

124 miles, Sterlington comp. sta., near Monroe to Jackson, Miss.

23 miles, 8-12-16-in., South Louisiana facilities.

53 miles, 24-in., authorized, Texas.

50 miles, 16-in., authorized, Baldwin County, Alabama, southeasterly to Escambia County, Florida.

All contracted by River Const. Corp., a joint venture including Oklahoma Contracting Co.; J. Ray McDermott & Co., Inc., and Morrison-Knudson. Inspection by Brown & Root, Inc.

**U.S.E.D.**—18 miles, 8⅝-in., contracted Norwalk to Long Beach, Calif. J. E. Young Pipeline Contractor, Inc.

**Utah Natural Gas Co.**—380 miles, 22-in. proposed, San Juan Basin area to Salt Lake Utah.

**Virginia Natural Gas Co.**—153 miles, Buckingham to Richmond and Portsmouth, Va.

**Western Kentucky Gas Co.**—2 to 4-in. under way, additions to present system. Modern Welding Co., Inc., contractor.

**Western Pipe Lines.**—1,200 miles, 22-in. planned, southern Alberta to Duluth, Minn.

**West Texas Gas Co.**—27 miles, 10-in., authorized, Lubbock to Abernathy, Tex.

**West Texas Gas Co.**—32 miles, proposed Potter and Randal counties, Texas.

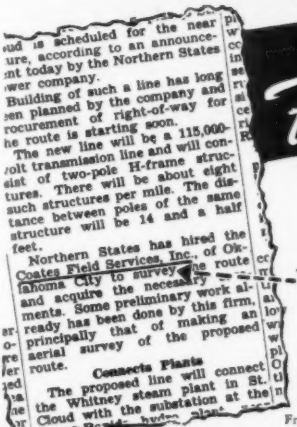
**Foreign Crude-Oil Pipe Lines—Planned and Under Way**

**Alberta-Vancouver Oil Pipe Line Co.** (Brokaw, Dixon, McKee).—972 miles, 16-in. proposed, Edmonton via Pincher Creek Alta., Idaho and Washington states to Vancouver, B. C.

**Cia. de Petroleo Ganso Azul, Ltd.**—4 miles, 4-in., planned, Ganso Azul field to Pucalpa on upper Ucayali River, Peru.

**Condor.**—90 miles, 12-in., under way, Ge-


# A man is known by the company he keeps


...ud is scheduled for the near ...ure, according to an announce... ...nt today by the Northern States ...wer company.
Building of such a line has long ...en planned by the company and ...rocurement of right-of-way for ...he route is starting soon.
The new line will be a 115,000-volt transmission line and will consist of two-pole H-frame structures. There will be about eight such structures per mile. The distance between poles of the same structure will be 14 and a half feet.
Northern States has hired the Coates Field Services, Inc., of Oklahoma City to survey the route and acquire the necessary ... ments. Some preliminary work already has been done by this firm, principally that of making an aerial survey of the proposed route.
Connects Plants
The proposed line will connect the Whitney steam plant in St. Cloud with the substation at the

From St. Cloud, Minn., Times

COATES Field Service

. . . and we're keeping mighty fine company! Northern States . . . a large, well-staffed organization that has recognized the wisdom of utilizing our "Package of Services" for pipe and transmission lines.

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Jack Coates, President

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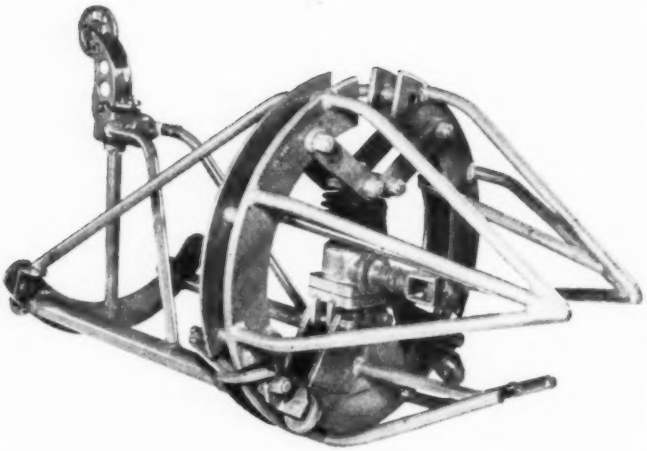
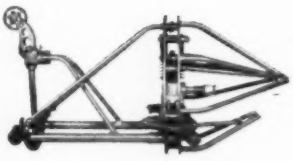
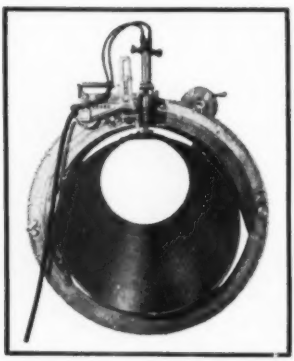
# CROSE INTERNAL LINEUP CLAMP





**CROSE INTERNAL LINEUP CLAMPS** are available in manual, electric and hydraulic models for pipe sizes ranging from 12" to 36". Crose Internal Lineup Clamps have been proven in world-wide field operations.



**CROSE PIPE CUTTING AND BEVELING MACHINE** for fast true cutting and beveling of pipe. Available in six sizes for 4" to 36" pipe. All machines are built of high strength, light weight aluminum alloys. The continuous ring which goes around the pipe is hinged so that these machines may be installed as easily from the side of the pipe as from the end. Machines for 16" pipe and above have "Out-of-Round" attachment as standard equipment.

M. J. CROSE
MANUFACTURING COMPANY, INC.
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noa to Rho, near Milan, Italy. Soc Ital Condotte Acqua Montubi, contractor. Completion date 7-31-52.

**Creole Petroleum Corp.**—143 miles, 26-in., authorized, Ule (State of Zulia) to Amuay (State of Falcon). Completion date March 1953.

**Creole Petroleum Corp.**—25 miles, 34-in., authorized, Lagunillas to La Salina (State of Zulia). Completion date April 1953.

**Direccion General de Yacimientos Petroliferos Fiscales.**—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

**Iraq Government.**—135 miles, 12-in., proposed, from Iraq Petroleum Co. at Baiji to Baghdad, Iraq. Construction 1952. M. W. Kellogg, contractor.

**Iraq Petroleum Co., Ltd.**—556 miles, 30-32-in., under way, Kirkuk, Iraq, to Banias, Syria, 1952; Bechtel-Kirkuk, contractor.

**Iraq Petroleum Co., Ltd.**—72 miles, 12¾-in., Zubair to Fao. Arabian Bechtel Co., contractor. Completion date 12-51.

**Kuwait Oil Co., Ltd.**—10 miles, 20-in., authorized, 3rd transit line Burgan-Ahmadi. Completion date 2-52. 6 miles, 30-in., authorized, 6th gravity loading line, Ahmadi-Mina al Ahmadi. Completion date 6-52. 5 miles, 16-20-in., authorized, Burgan field—oil collecting line. 2-52.

**Middle East Pipelines, Ltd.**—800 miles, 34-35-in., planned, Iran to a Levantine port.

**Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

**Petroleos Mexicanos.**—100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

**Shell Caribbean Petroleum Co.**—160 miles, 30-in., under way; Palmajero to terminals on the Paraguana Peninsula (Cardon and Las Piedras, Venezuela), 4-52. Land sections contracted by Williams Brothers, de Venezuela, S.A., Charles P. Williams, manager, Marvin E. Jones, superintendent. Water crossings contracted by Mahoney Contracting Co.

**Texas Petroleum Co.**—60 miles, 4-6-in., under way, Pto. Nino to La Dorada.

**Trans-Mountain Oil Pipe Line Co.**—715 miles, proposed, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers.

**Foreign Products Pipe Lines—Planned and Under Way**

**Colombia Ministry of Petroleum.**—90 miles 6-in., planned, Puerto Berrio to La Dorada, Colombia.

**Colombia Ministry of Petroleum.**—113 miles, 6-in., contracted, Puerto Berrio to Acededo near Medellin, Colombia. Carolina Construction Co.

**Colombian Ministry of Petroleum.**—75 miles, 4-in., planned, Buena Ventura to Cali, Colombia.

**Empresa de Ferrocarriles Ecuatorianos.**—50 miles, 4-in., contracted, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C.R.C. Engineering Co., engineers.

**Estrada de Ferro Santos a Jundiai.**—32 miles, 18-in., under way, Santos to Sao Paulo, Brazil (fuel oil line); Techint, contractor. Completion date 12-51.

**Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

**Imperial Oil Co., Ltd.**—230 miles, 10-12-in., under way, Sarnia via London, Hamilton to Toronto, Ont., Canada. Comstock Midwestern, Ltd., contractor. Completion date July 1952.

**Petrocongo (Sub. Cie. Financiere Belge des Petroles, S.A.).**—225 miles, considered, Ango-Ango to Leopoldville, Belgian Congo.

**Petroleos Mexicanos.**—155 miles, 10-in., under way, Minatitlan to Salina Cruz, Mexico.

**Societe des Transports Petroliers par Pipe Line.**—140 miles, 10-in., under way, Le Havre to Paris, France. Entrepose, contractor. Completion date 1952.

**State of Cundinamarca, Colombia.**—120 miles, 6-in., Puerto Salgar to Bogota, Colombia; Williams Brothers Co.; David Louthen, manager, Bogota.

**Trans-Northern Pipe Line Co.**—400 miles.

proposed, Hamilton, Ont., to Toronto, Ont., to Montreal, Que., Canada.

**Foreign Natural-Gas Pipe Lines—Planned and Under Way**

**Azienda Generale Italiana Petroli.**—110 miles, 12-14-16-in., planned, Cortemaggiore to Genoa.

**Azienda Generale Italiana Petroli.**—145 miles, 14-16-in., under way, Cortemaggiore to Torino. Completion date 1951.

**Canadian Delhi Oil Co. (Subsidiary Delhi Oil Co.).**—2,132 miles, proposed, Alberta, Toronto, Montreal.

**Direccion General del Gas del Estado.**—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

**Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

**Petroleos Mexicanos.**—205 miles, 16-in., considered, Monterrey to Torreon, Mexico.

**Petroleos Mexicanos.**—260 miles, 20-in., under way, Monterrey to Tampico and Poza Rica, Mexico.

**Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.**—600 miles, planned, Reynosa, Tamaulipas, to Tampico-Poza Rica, Mexico.

**Trans-Canada Pipe Lines, Ltd.**—Proposed, Alberta to Toronto to Montreal.

**Venezuela Atlantic Transmission Corp.**—195 miles, 10-12-16-in., under way, El Placer near Las Mercedes, State of Guarico to Caracas, La Guaria, Maracay, and Valencia. Contracted by Williams Brothers, de Venezuela, S.A., B. E. Barnes, manager.

**Westcoast Transmission Co., Ltd.**—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

**Westcoast Transmission Co., Ltd.**—280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis, engineers.

**Western Pipe Lines.**—1,033 miles, 24-in., proposed, from Southern Alberta, eastward across the Canadian Prairies, serving principal towns and cities along the route to a point near the International Boundary.

*"I warned you guys a notorious flag-pole sitter was heading this way."*

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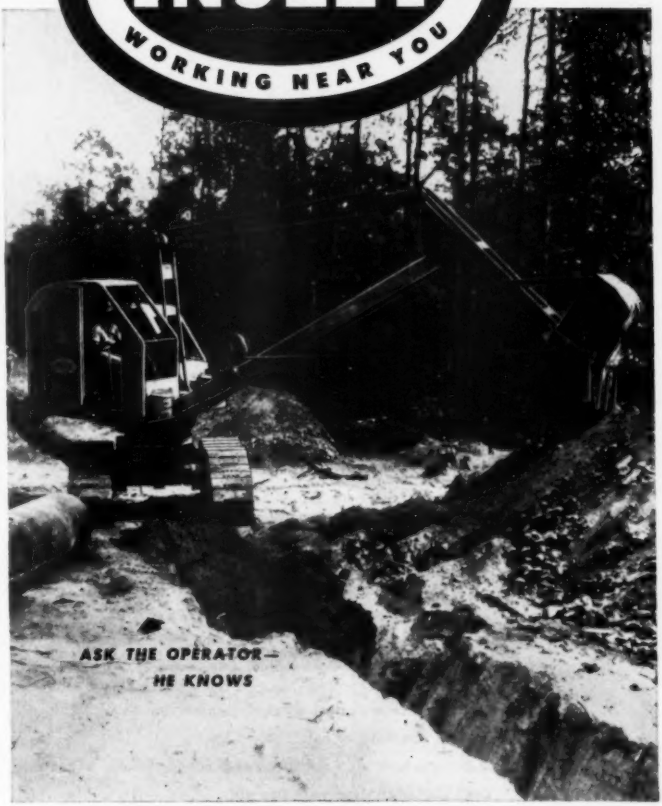


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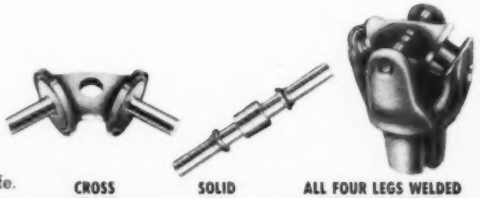

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ALL FOUR LEGS WELDED SOLIDLY TOGETHER

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**OIL TOOL CO.**

GENERAL OFFICES, EXPORT OFFICE AND PLANT
COMPTON, CALIFORNIA

# Among the Drilling Contractors

## Osborne to Operate Yockey Drilling Rigs

Yockey Oil Co., Inc., Wakeeney, Kans., has assigned its two rotary rigs to Harry T. Osborne, president of the company, who, as an independent contractor, will operate them under his own name. Osborne will maintain headquarters at Ft. Morgan, Colo., with Harry Ingrahm as tool pusher. One rig now is working in Colorado, and the other in Kansas. Yockey Oil Co. will continue as a producing firm.

**Atkins & Pannell** are drilling at their second location in the new Nacatoch sand producing area northwest of the Falcon field, Nevada County, Arkansas, where they are contracting for Arthur Russell of Prescott, Ark. The new operation is at a location northeast of the discovery well, 1 fee, which they recently completed as a small pumper in Nacatoch sand at 1,648-58 ft. It is projected to 1,850 ft.

**Barnett Drilling Co.,** Wichita, is the contractor on a test which Magnolia Petroleum Co. is starting in the new pool opened by Musgrove Petroleum Co. 7 miles southwest of Gove, in Gove County, western Kansas. Magnolia's test, 1 Moore, SW SW NW 25-13-30, is a northeast offset to the discovery well, completed as a Mississippian producer at 4,547-50 ft.

**Renshaw Brothers** have a new operation under way in the Smackover field, Ouachita County, Arkansas, where they are drilling for N. L. Barrett. The new job is at 1 Pool, C SW SE 25-15s-16w. Contract is for 2,700 ft.

**Wagner & Wyant Drilling Co.,** Amarillo, Tex., is drilling for Amerada Petroleum Corp. at 1 Weninger, a wildcat test located in the NE NE SE 23-2s-53w, 6 miles south of Elba, in Washington County, eastern Colorado.

**Exploration Drilling Co.,** Tulsa, is drilling a Wilcox sand exploratory test for Carter Oil Co. in the area 4 miles northwest of Negrett, Sabine Parish, Louisiana. Hole is designated as 6 Louisiana Long Leaf.

**Southern Production Co.,** Shreveport, has three new deep contract operations under way in coastal Louisiana. One, a projected 11,800-ft. test being drilled for Deep South Oil Co., is located in the Erwinville area, 13 miles west of Baton Rouge, in West Baton Rouge Parish. Another, a projected 10,500-ft. test, is being drilled for John L. Loeb on the latter's State lease 1824 in St. Bernard Parish. The third is a 9,950-ft. well, No. 59, for The California Co. in the Romere Pass field, Plaquemines Parish.

## New Drilling Company

Central Drilling Co. is a new rotary contracting firm now operating in the Illinois basin region. Organizers are J. G. Powell, A. C. Stoltz, and C. E. Burns. Main offices are at Lawrenceville, Ill. C. W. Dittman, drilling superintendent, will be located at Vincennes, Ind.

**Kemp Drilling Co.,** Shreveport, is starting an 8,300-ft. test for W. N. Ulmer and associates at an outpost location in the Pistol Ridge area, Forrest County, Mississippi. Location is for 1 Batson unit, in the NW SE NW 21-18-13w.

**Caskey Drilling Co.,** Dawson Creek, British Columbia, has contracted to drill a test 2 miles northwest of the Bonanza settlement in the Peace River area of northwestern Alberta Province, Canada. The location, in LSD 6, 13-80-13w6, is 4 miles east of the British Columbia line. Contract is with Wilrich Petroleums, Ltd.

**Commonwealth Drilling Co.,** Calgary, contracting for Canadian Gulf Oil Co., is starting a test at a wildcat location 13 miles west of Stettler, 90 miles northeast of Calgary, in Central Alberta Province, Canada. The test, designated as 4 Lampert, with location in LSD 4, 32-38-22w4, will be carried to the Devonian.

**Workover, Inc.,** Houston, is starting another well for Pan American Production Co. in the Valentine field, Lafourche Parish, coastal Louisiana. It is 28 Harang, in 6-17s-20e. Projected depth is 9,750 ft.

**Falcon Seaboard Drilling Co.,** Tulsa and Houston, has a rig working for Sun Oil Co. and Atlantic Refining Co. in the North Cankton field, St. Landry Parish, Louisiana. Latest operation is 1 Devillier, in 23-8s-3e, contracted to 9,200 ft.

**Trident Drilling Co.,** Calgary, has a heavy rig working at a wildcat location in the Carbon area, 45 miles northeast of Calgary, Alta., Canada, where it is drilling for Socony-Vacuum Exploration Co. Hole is projected to the Cambrian, expected around 8,000 ft. Location is for 1

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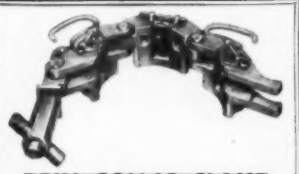

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Carbon-CPR, in LSD 13, 20-28-22w4. This contractor also is starting another wildcat test for the Bailey group in the Travers area, 25 miles north of Lethbridge. The latter test, in LSD 16, 21-13-20w4, is projected to 4,800 ft.

**Young Drilling Co., Ltd.**, Calgary, is moving a rig from the Chancellor area in southern Alberta Province, Canada, to the Red Deer Lake-New Norway area, in the central part of the province where it is scheduled to drill a Devonian test for Calnorth Oils, Ltd. The Calnorth project is about 2 miles from production recently discovered in that general area.

**Monroe Drilling Co.**, Monroe, La., has two new contracts for wells in northeastern Louisiana. One is for a Tuscaloosa sand well, 12 Delta, to be drilled for Stanolind Oil & Gas Co. in 9-16n-7w, Big Creek field, Richland Parish. The other will be a Gas Rock well to be drilled for Louisiana Gas Producing Co. at 1 Nolen, in 13-20n-2e, Monroe field, Union Parish.

**E. A. Rumley**, Oklahoma City, has contracted with Fred Jones, Oklahoma City automobile dealer, for a basal Simpson sand test to be drilled in the South Moore field, Cleveland County, Oklahoma. Objective is expected around 9,700 ft. The test is located on the Fritz lease in the SE SE NE 27-10n-3w.

**Greyhound Drilling Co., Inc.**, El Dorado, Ark., is starting its second test in the newly opened Rockpoint field, Caddo Parish, northwestern Louisiana, where it is operating as contractor and part owner with M. T. Halbouty of Houston. The new test, 1 Kirby, in the C SE NE 13-20n-15w, is 2,000 ft. southwest of the discovery well, completed as an oil producer in a 3,700-ft. sand (Kilpatrick zone). It will be drilled to the Pettit sand around 5,000 ft., to which the discovery well also was drilled and found good showings.

## ACTIVE ROTARY RIGS*

(United States and Western Canada)

| Area— | Week ended 2-18-52 | Change week ended 2-11-52 | Change week ended 2-19-51 |
|---|---|---|---|
| Gulf Coast | 579 | + 5 | + 78 |
| N. & W. Tex.-N. M. | 1,035 | —17 | +290 |
| Ark.-N. La.-E. Tex. | 160 | + 3 | + 33 |
| Oklahoma | 331 | + 6 | +107 |
| Kansas-S. Nebraska | 171 | +16 | + 27 |
| Illinois-Eas'ern | 79 | + 8 | + 6 |
| Rocky Mountains | 135 | — 1 | + 51 |
| Pacific Coast | 173 | + 3 | + 38 |
| Total U. S. | 2,703 | +23 | +630 |
| Western Canada | 179 | + 5 | + 77 |
| Total | 2,882 | +28 | +707 |

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Rocky Mountains and Western Canada areas are shown on pages 228 and 229.

**Penrod Drilling Co.**, Shreveport, has the contract for a wildcat test which W. C. Feazel is starting at 1 Baptist Orphanage, in the C SE SW 22-18n-5e, 3 miles northeast of Milhaven, Ouachita Parish, Louisiana. Hole will be carried to the Cotton Valley formation.

**Rex Drilling Co.**, Shreveport, has taken a contract for a 10,000-ft. Travis Peak test to be drilled for Whitclay Oil Operators, Inc., Houston, at a wildcat location 2 miles west of Womack, Jackson Parish, Louisiana. Location is for 1 Tremont, in the NE SW NW 31-15n-1w. It is 3 miles southwest of the Chatham gas field.


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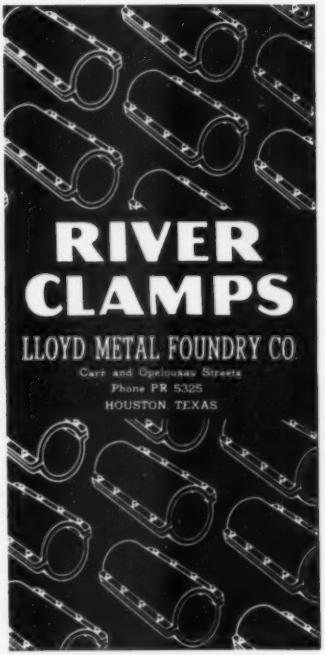


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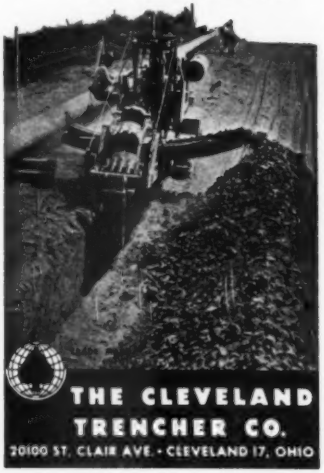

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# PIPE LINES

## FPC Report

### 1,463 miles of gas lines o.k.'d in last half of '51

WASHINGTON.—The Federal Power Commission authorized construction of 1,463 miles of natural-gas pipe line and related transmission facilities during the last 6 months of 1951, which will add more than 350,000,000 cu. ft. per day to the nation's pipe-line delivery capacity.

Thomas C. Buchanan, FPC chairman, said that the new transmission facilities would cost an estimated $86,498,922. About $75,858,103 of the total construction cost is going into projects estimated to cost $700,000 or more. These projects will increase delivery capacity of individual systems by more than 325,000,000 cu. ft. per day and will benefit 88 cities of 50,000 population or more in 18 states and the District of Columbia as well as many small communities, Buchanan said. The major projects involve construction of 1,039 miles of new line and installation of 79,030 hp. in compressor facilities.

**Biggest project.**—El Paso Natural Gas Co.'s $23,400,000 expansion of its system in Texas, New Mexico, and Arizona required the largest capital outlay of any project authorized by the commission.

The company is installing 10 miles of 30-in. loop line in Texas and a total of 56,070 additional horsepower in compressor stations in Texas, New Mexico, and Arizona to increase deliveries to existing customers in this three-state area by 100,000,000 cu. ft. per day. Most of the new capacity will be used to meet climbing demands in the Phoenix, Ariz., area.

**Summary for 1951.**—FPC o.k.'d construction of 6,091 miles of pipe lines and 426,500 hp. in compressor installations during the 1951 calendar year. Total construction cost is estimated at $471,383,184.

Major projects (costing over $700,000) call for expenditures of about $454,657,645 and involve building 5,589 miles of pipe lines and 405,875 hp. in compressor units. These projects will add more than 2,250,000,000 cu. ft. of gas to daily delivery capacity of the systems involved.

## Texas Gas Transmission to Lay Loops, Add Horsepower

OWENSBORO, Ky.—Texas Gas Transmission Corp. plans laying of 408 miles of 26-in. loop lines and the installation of 26,860 hp. at compressor stations under its revised expansion program.

The looping will be laid in six sections as follows: 223 miles from Bastrop, La., to Covington, Tenn.; 47 miles northeast from Covington; 49 miles northeast from Kenton, Tenn.; 45 miles northeast from Calvert City, Ky.; 25 miles northeast from Slaughters, Ky.; and about 19 miles southwest from Jeffersontown, Ky.

The Federal Power Commission has authorized temporarily the construction of a new 5,280-hp. station at Madison, Ind., and the installation of 6,960 hp. at four existing stations in Kentucky at Kenton, Calvert City, Slaughters, and Hardinsburg. Work is now under way for these compressor installations. Hearings on the company's looping and compressor program will begin in March.

## Louisiana Program

### Interstate to modernize, expand system this year

SHREVEPORT.—Interstate Oil Pipe Line Co. has revealed plans for extensive expansion and modernization of its system in three areas of Louisiana this year.

The company will increase capacity of its southern Louisiana trunk system to 55,000 bbl. per day, modernize the Bunkie-Melville section of its Shreveport-Baton Rouge main line, and boost capacity of its southwestern Louisiana system to 80,000 bbl. per day.

**Southern system.**—Interstate will kick off early this summer on a construction program which will increase capacity of its southern system in the state to handle expanding production from Plaquemines, Lake Chicot, Valentine, Raceland, Delta Farms, Golden Meadow, Napoleonville, Bully Camp, Bayou Choctaw, and Bayou Couba fields.

The program involves construction of .68 miles of 16-in. to replace the existing 8 and 10-in. trunk line between Raceland and Anchorage Terminal near Baton Rouge, and laying of 18 miles of 12-in. south of Raceland to replace the present 6 and 8-in. line between Raceland and LaRose stations. Completion is scheduled by fall.

**Southwestern system.**—On its southwestern system, the company will replace an existing 8 and 10-in. line from Sunset to Anchorage Terminal with 55 miles of 16-in.; lay 23 miles of 12-in. south of New Iberia to replace the existing 6-in. line between New Iberia and Bayou Sale; and

build a new 1,200-hp. pump station near New Iberia.

Completion of this construction in late fall will boost capacity out of important producing areas from Baton Rouge to North Crowley on the west and to Bayou Sale on the south. Work is scheduled to begin during the middle of the summer. Contracts have not been let.

A 4 and 6-in. gathering system in Duck Lake field, St. Martin Parish, and a connecting 9-mile, 8-in. line to the trunk line near Bayou Sale were placed in operation early this month.

**Bunkie-Melville.**—Replacement of the company's old Bunkie station with a new 3,000-hp. pump station employing dual-fuel engines is now under way and should be completed by mid-summer. Contracts will be let before the station is completed for construction of 32 miles of 20-in. line between Bunkie and Melville stations to replace existing 8 and 12-in. lines. The project will include a 12-in. submarine crossing of the Atchafalaya River near Melville.

## Sun Prepares for West Texas Expansion Program

SNYDER, Tex.—Sun Pipe Line Co. of Pennsylvania has set up West Texas headquarters here to expedite its 1952 expansion program in this area.

The company plans construction of about 100 miles of lines in Kent, Scurry, Coke, Nolan, Mitchell, and Fisher counties this year. With existing lines operated by Sun, the new construction will lengthen the company's six-county system to 250 miles.

H. A. Johnson, superintendent, said the program will facilitate shipments to refineries at Lima, Ohio, and Philadelphia. Runs will be raised considerably over the present movement of 30,000 bbl. per day.

The lines will be tied into the new big-inch crude line now being built by West Texas Gulf Pipe Line Co. Sun's crude will move through the West Texas Gulf system to Wortham and Longview, Tex., then into a company line to the eastern refineries.

Before the new West Texas area office was formed, Sun's operations in this area were directed from a district office on the Martin lease southwest of here. The new area office was set up following the merging of all the company's pipe-line operations under the one new company, Sun Pipe Line Co. of Pennsylvania, effective December 31, 1951.

## Pipe-Line Briefs

**The Tulsa section of the National** Association of Corrosion Engineers will hold the third annual Tulsa short course for pipe liners February 27-29 at the Mayo Hotel. J. R. Cowles, Oklahoma Natural Gas Co., and W. E. Huddleston, Huddleston Engineering Co., will conduct field demonstrations at pipe-line locations, together with nontechnical lectures and discussions on coatings, insulating flanges, cathodic protection, and corrosion testing. The course is held primarily for foremen, superintendents, field engineers, and inspectors.

**Michigan - Ohio Pipeline Corp.**, Grand Rapids, Mich., has been granted a certificate by the Defense Production Administration for accelerated amortization on 25 per cent of $60,000 for a $1,593,333 crude-oil pipe line.

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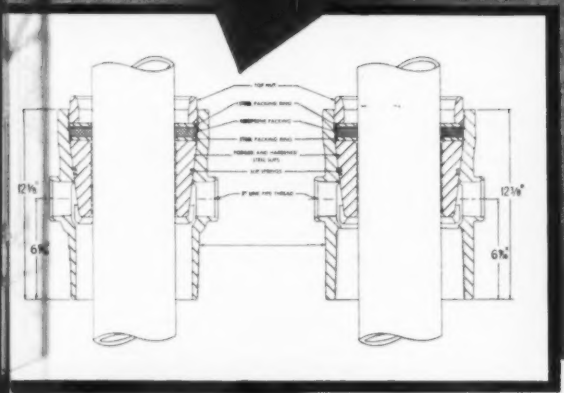

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# NATURAL GAS

## Texas Produces 412,000,000 M.c.f. of Gas in December

AUSTIN. — Production of natural gas in Texas during November totaled almost 412 billion cubic feet, according to the Texas Railroad Commission.

This was about 10 billion cubic feet more than was produced in October and about 16 per cent more than the November output in 1950.

Marketed production chalked up a 22 per cent gain over November 1950 with a total of 328 billion cubic feet. Transmission lines bought almost 253 billion cubic feet, 27 per cent more than a year earlier. About 155 billion cubic feet was shipped out of the state.

Producers used 14 billion cubic feet in gas-lift operations, up 18 per cent, while volumes consumed in pressure maintenance, repressuring, cycling, and carbon-black-manufacturing operations decreased slightly from November 1950 figures.

## Higher Rates to Domestic Consumers Said Inevitable

NEW YORK.—Columbia Gas System, Inc., said last week that higher gas rates to domestic customers are inevitable.

In its 1951 annual report, the company told its stockholders that increased operating costs and taxes were reflected in 1951 by a drop in company earnings, which occurred even though its revenues increased 18 per cent to the highest figure in history.

The report said that steadily increasing sales had kept profits at a reasonably satisfactory level until recently when taxes and costs began rising even faster. Columbia spent $73,000,000 last year and expects to spend $75,000,000, a new peak, this year. The company's proven reserves in Appalachian area were discussed about 100 billion cubic feet to 2,264 billion cubic feet, and underground-storage facilities were expanded 45 billion cubic feet to a new total of 173 billion cubic feet during the year. About $77,000,000 of gas was purchased during the year at an average price of 23 cents per M.c.f.

## Appliance Manufacturers' Defense Output Climbing

NEW YORK.—Manufacturers of gas appliances are devoting about one-fifth of total production capacity to defense work, a survey of the Gas Appliance Manufacturers Association shows. This figure, considerably higher than a year ago, "is encouraging" in regard to both the defense effort and the industry's 1952 outlook, G.A.M.A. said.

Defense contracts, however, have not been spread evenly throughout the industry. According to the survey, large companies have received the major share of the contracts. It also shows that smaller firms are being hit by materials shortages. "It has become apparent that smaller companies must either get more liberal materials allocations or be given a larger share of defense work," the association said.

## 1951 Sales Up 16 Per Cent

NEW YORK.—Sales of natural gas in 1951 totaled 44,667 million therms, an increase of 16 per cent over 1950's sales, the American Gas Association reports.

Sales during December, 4,740 million therms, were up sharply from the 4,076 million therms sold in November and were 11.3 per cent above the 4,258 million sold in December 1950.

The association's index of sales for the month was 376.6 per cent of the 1935-1939 average. Combined sales of manufactured and mixed gas for the month were 336.6 million therms, down 1.7 per cent from sales in December 1950.

## Short-Course Dates Changed

HOUSTON.—The 1952 Southwestern Gas Measurement Short Course, originally scheduled for April 8-10 at the University of Oklahoma at Norman, has been moved ahead to May 27-29.

Kate A. Niblack, publicity chairman, said the change was necessitated because the Navy's occupacy of base facilities at Norman required an adjustment in housing arrangements.

# Natural Gasoline

## New Tex-Harvey Plant On Stream Near Midland

MIDLAND, Tex.—Initial operations are under way at the new Tex-Harvey gasoline plant, 18 miles south of here.

The new installation, owned jointly by Tex-Harvey Gasoline Co. and Anchor Gasoline Corp., is processing about 10,000,000 cu. ft. of gas daily at present. Operations began before construction was completed to reduce the volume of gas being flared in the area served by the plant. Capacity operation is scheduled to to begin this fall at a reported throughput of about 35,000,000 to 50,000,000 cu. ft. of natural gas per day.

The plant was designed by J. B. Gill Co. It gathers gas from producing properties of Tex-Harvey Oil Co., J. H. Floyd, Den-Tex Oil Co., Velma Petroleum Co., Ashland Oil & Refining Co., Union Oil Co. of California, Olsan Brothers, Lomax Brothers, and Sohio Petroleum Co.

## Two Companies Introduce L.P.G.-Powered Trucks

CHICAGO. — Two truck-manufacturing firms, International Harvester Co., Chicago, and Reo Motors, Inc., Lansing, Mich., have begun production of new lines of trucks powered by liquefied petroleum gas.

W. K. Perkins, International's manager of motor-truck sales, said that International's new L.P.G. engines are optional on all truck models equipped with the company's heavy-duty Super Red Diamond engines. The fuel is not only several cents cheaper per gallon than gasoline, he said, but its use also results in cleaner engines, thereby reducing maintenance costs. Fuel tanks on the new line are built for runs of as far as 400 miles between refuelings.

Reo's new line covers a weight range from 20,000 lb., gross vehicle weight as a truck, to 40,000 lb. as a tractor. Wheel bases range from 130 in. to 203 in. The company also is offering its new 142-hp. engine as a replacement power plant for all trucks regardless of make.

## N.G.A.A. Meeting to Feature Sulfur-Extraction Processes

ODESSA, Tex.—Discussions of sulfur-extraction processes and a field trip to a new extraction plant will highlight the Permian basin regional meeting of the Natural Gasoline Association of America to be held here this week.

Clyde L. Blohm, Fluor Corp., Los Angeles, will present the principal paper on the subject, "Processing Sulfur Bearing Gases," at the February 29 meeting. A tour through the sulfur plant at Odessa Natural Gasoline Co. and Sid Richardson Carbon Co. will follow presentation of the paper.

Other technical papers scheduled for presentation include: "Valve Maintenance," William Boles, Lunkenheimer Co., Wichita Falls, Tex.; "Gas Driven Centrifugal Compressors," C. L. Moore, El Paso Natural Gas Co., El Paso, Tex.; and "Engineering of the Past," Sam Carney, formerly with Phillips Petroleum Co., Bartlesville, now retired.

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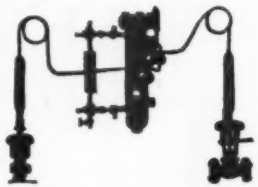

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# REFINING

## Conoco's New Lake Charles Units Going Up on Schedule

LAKE CHARLES, La.—Continental Oil Co.'s $24,000,000 expansion program at its refinery here is progressing on schedule, according to D. R. Johnson, manager of the company's manufacturing department, and completion of the project is expected late this fall.

When the new facilities go on stream, crude-oil capacity of the plant will have been raised from 12,000 bbl. per day to 40,000 bbl.—more than triple the original 1941 capacity of the plant.

Work began in August of last year. Since then foundation work has been practically finished, and off-site tank work, cooling-tower installations, and pipe lines all are nearing completion. At present towers and compressors are being installed.

Main additions to the plant include a crude-distillation unit, a catalytic cracking unit, a Platforming unit, a gas-recovery unit, and a solvent-extraction unit for the separation of benzene and toluene.

The integrated plant will produce fighter-grade gasoline, motor gasoline, kerosine, burner distillates, and diesel fuels. Stocks will also be supplied to the nearby Cit-Con Corp. lube-oil plant and Continental's new carbon-black plant adjacent to the refinery.

Prime contractors on the project are Badger Process Division of Stone & Webster Engineering Corp., and Procon, Inc., a subsidiary of Universal Oil Products Co.

Superintendent of Continental's Lake Charles refinery is J. M. Jones.

*RAPID PROGRESS.—Continental Oil Co.'s Lake Charles refinery will begin handling about 28,000 bbl. more crude per day late this fall when new facilities now under construction are completed. Towers and compressors presently are being installed.*

## Esso Standard Reveals New Expansion at Baton Rouge

BATON ROUGE.—Esso Standard Oil Co. will increase its building program, announced last October, by an additional $16,000,000 to make the project a $51,000,000 undertaking.

H. J. Voorhies, vice president and general manager, said the new construction, which is an extension of the original expansion program, will include new distillation units and expansion of fluid catalytic cracking facilities. Additional equipment will be erected to expand chemical-treating, blending, and shipping facilities and auxiliary installations.

Completion of the additional facilities is expected in 2 years, Voorhies said.

The Baton Rouge plant had a wartime capacity of 135,000 bbl. of crude per day. This has been increased during postwar years and will be further increased to give the plant a throughput in excess of 270,000 bbl. per day.

## California Standard Plans Early Start on Phenol Plant

SAN FRANCISCO.—Standard Oil Co. of California will begin construction soon of its new synthetic phenol plant at Richmond, Calif. *(The Oil and Gas Journal, November 8, 1951, page 345.)*

T. S. Petersen, company president, said all research has been completed, and design work is nearing completion.

The new plant will produce phenol and acetone using a recently developed synthesis process requiring neither sulfuric acid or chlorine, both of which are now classified as scarce materials.

Petersen said government approval

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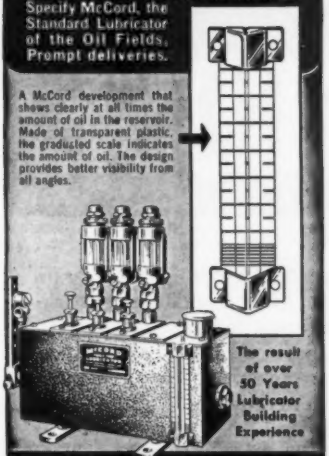

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has been granted for construction of the new plant, first such installation in the West.

## Commercial Quantities of Benzonitrile Now Available

NEW YORK.—Socony-Vacuum Oil Co., Inc., has announced that commercial quantities of benzonitrile, a chemical with a wide variety of potential industrial uses, are again available.

The colorless liquid is produced exclusively at the company's Paulsboro, N. J., refinery by a unique process involving the catalytic reaction of petroleum stocks with raw ammonia. It has been in production for some time, but only in limited quantities due to a basic raw-material shortage.

Henry K. Chapin, Socony-Vacuum's manager of chemical products, said the greatest use of benzonitrile at present is in resin manufacture. Reacted with dicyandiamide, it yields an intermediate useful in manufacturing "melamine" resins.

The chemical has potential uses in the synthesis of dyestuffs, germicides, surface-active agents, plant hormones, soil sterilents, and drug intermediates. Because of its physical characteristics, it may be of interest to rubber reclaimers, vinyl resin plasticizers, and wool cleaners. Socony has prepared a complete technical memorandum, which, together with working samples, is available on request.

## Refining Briefs

**Monsanto Chemical Co. is reported** planning erection of a phenol plant at Avon, Calif., near the recently announced sulfuric acid plant to be owned jointly by Monsanto and Tide Water Associated Oil Co. The new phenol installation will employ Monsanto's recently developed synthesis process, and it is believed that the operation will be at least partially based on raw hydrocarbon stocks to be provided by Tide Water. Construction is planned to begin this summer, and completion is expected in early 1954.

**National Cooperative Refinery Association** has revealed that it will ask the Petroleum Administration for Defense for steel to build a $2,000,000 coking unit at its McPherson, Kans., refinery. Ralph Booker, general manager, said the coker is needed to reduce the refinery's production of fuel oil, which amounted to over 1,400,000 bbl. last year. Heavy fuel oil is becoming a drug on the market, he said, with many refineries forced to reduce operations temporarily because they have no place to store or sell it. The coker would increase the refinery's yield of gasoline and heating oils by about 9 per cent and cut residual production by about 70 per cent, he said.


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# California Field Trips

ABOUT a month from now geologists and geophysicists from all sections of the United States and a few foreign countries will be gathering in Los Angeles for the joint annual meeting of the American Association of Petroleum Geologists, the Society of Exploration Geophysicists, and the Society of Economic Paleontologists and Mineralogists.

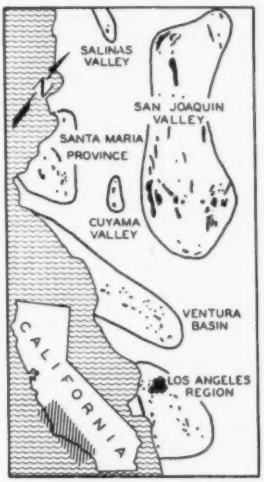
A majority of the scientists planning to attend this big meeting are specialists on portions of the Rocky Mountain area, the Permian basin, the Mid-Continent area, the Gulf Coast, or eastern states, and know little more about California's geology and oil fields than they know about Argentina's or Borneo's.

These out-of-state visitors know that California is the second largest producing state in this country. They believe that most of the big oil fields are located "somewhere around Los Angeles," but wouldn't bet on it. They can name a few giant fields such as Long Beach, Ventura Avenue, and Midway-Sunset. They know that California pioneered offshore development. They may have heard (and probably doubted) that some wells in the thick, poorly cemented sands of Tertiary age have produced 1 million barrels of oil per acre. But, that's about all.

In order to fill in this gap in the knowledge of the scientists from the "hinterland," the California hosts have planned several field trips. Thus, in addition to the meetings, which will follow much the same pattern that they would in St. Louis or Chicago, those attending the convention can expose themselves to California's complicated oil-field geology with the aid of guides and a comprehensive guide book.

The field trips will cover the four important oil-producing provinces: the San Joaquin Valley, the Santa Maria province, the Los Angeles basin, and the Ventura basin; and two basins of lesser importance to date: the Cuyama Valley and the Salinas Valley. All of these provinces were areas of downwarp and sedimentation during a great part of Tertiary and even Quarternary times.

A preconvention trip will go south from Los Angeles to Wilmington




field. This field produced 51 million barrels of oil last year to retain its status as the second-largest producing field in this country. The geology of this large, irregular, faulted dome will be described and slant-drilling techniques discussed. Many of the oil fields in the Los Angeles basin are on knolls that reflect anticlinal structures as well as illustrated by Signal Hill which will be visited on the return trip.

One of the postconvention trips will go to the eastern end of the deep (60,000 ft.) Ventura basin. California's deepest well was drilled to 18,734 ft. near the axis of this geosyncline and just reached the top of the Miocene section. After visiting the recently discovered Placerita, Honor Ranch, and Castaic fields, the caravan will cross the mountains into Cuyama Valley, a small, long-frowned-upon prospect which has yielded three major fields in the past 4 years.

In the Salinas Valley, another basin in the Central Coast ranges, a few low-gravity-oil fields (San Ardo group) have been partially developed. These fields are to be seen on a trip which also goes through the Ventura and Santa Maria basins on the way to San Francisco.

Another postconvention trip will cross the famous San Andreas fault, probably the longest shearing plane yet discovered, into the San Joaquin Valley. Here most of the folds are elongated and some have thousands of feet of closure to give California such fields as Coalinga and Kettleman Hills.

Those who take one or more of these field trips are going to leave California with a great deal more practical information than the meetings alone can provide.

*Philip C. Ingalls.*

## HIGHLIGHTS OF WEEK'S DEVELOPMENTS

**ROCKY MOUNTAIN AREA.**—Shell Oil Co. has completed two new discoveries in the Denver-Julesburg basin and Sinclair Oil & Gas Co.'s discovery in the Parke area, Logan County, flowed 330 bbl. of oil in 24 hours. Mountain Fuel Supply Co. is testing at a deep wildcat in southwestern Wyoming. The U. S. Navy apparently has a new-pay discovery at Teapot Dome, Wyoming. Two North Dakota wildcats found water on tests this week.

**OKLAHOMA.**—Phillips Petroleum Co. has found indications of another Springer discovery for Garvin County. The wildcat is the 1 Denson, SW SW SW 18-3n-3w, 3 miles west of the Golden Trend Development. On a 1-hour drill-stem test from 9,501-21 ft. in the Springer 20 ft. of clean oil and 90 ft. of slightly oil-cut mud were recovered.

**WEST TEXAS.**—The Flat Rock-Ellenburger field, producing from the Spraberry, regained its status as an Ellenburger field at Cities Service and Continental 2 University, east offset to the original discovery. Completion potential was 313 bbl. a day from 50 ft. of pay.

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# Texas Gulf Coast

## Yegua Oil Discovery Completed in Polk County

HOUSTON.—Shell Oil Co. has completed a new Yegua oil discovery in Polk County 1 mile west of Segno field. The well, 1 Kirby Lumber Co., Tract 125-A, flowed 4 bbl. of oil hourly from perforations at 5,322-40 ft. through $\frac{8}{64}$-in. choke. Tubing pressure registered 825 psi. and casing pressure 1,300 psi. Discovery is located in James Stephenson Survey, Abstract 523.

Two and one-half miles northeast of Bancroft in Orange County, Gabriel Oil Co. has completed 1 Leon Dartez for a gas-distillate discovery. The well was completed in the 8,100-ft. zone and is shut in waiting on potential test. Operator drilled it to 8,912 ft. and set 5½-in. production string at total depth. The new discovery is also located 1 mile southwest of Echo field.

Six miles south of Nome in Jefferson County, Hunt Oil Co. has completed 4 Dishman-Lucas for 125 bbl. of oil daily through 10/64-in. choke. Production is from perforations at 5,314-20 ft. A previous drill-stem test near total depth of 8,671 ft. showed recovery of 651 ft. of pipe-line oil with bottom-hole flowing pressure of 3,650 psi. The new discovery is now shut in waiting on tanks. It is located in William McFarland Survey, Abstract 39.

Potential test has been run at Deep South Oil Co. 1 Security Bank, deep gas-distillate discovery 8 miles east of Stowell in Jefferson County. On open flow test, the well flowed 14,000,000 cu. ft. of gas per day plus an ungaged amount of 50.7°-gravity distillate. Production is through perforations at 10,058-90 ft. This discovery is located west-southwest of Big Hill production in Section 164, Block 48, Ben Son subdivision, T&NO Survey.

New pay has been established in East Mauritz field, Wharton County, at Johnson & Appling 1-A Kountze & Stewart. The well is cleaning out after flowing an ungaged amount of oil from perforations at 6,790½-94 ft., the deepest pay in the field.

New deep oil production has been opened in Clinton field, Harris County, at Stanolind Oil & Gas Co. 1 Bellnoski, Reels and Trobough Survey, Abstract 59. From perforations at 8,541-48 ft., the well flowed 30°-gravity oil at the rate of about 10 bbl. per hour. Flowing pressure was 1,500 psi. Flow was gaged through ¼-in. choke.

### TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT SUCCESSES

Bee County: Oil discovery—Morris Cannan 1 W. Robertson, C. B. Shain Sur., A-305, TD 7,312 ft., Slick-Wilcox 6,810-14 ft., IP 123 bbl. oil per day, 38° gravity, CP 1,525 psi., TP 600 psi.

Refugio County: New pay at E. Refugio—Union Oil Co. of California 4. J. J. O'Brien, Refugio Town Tract Sur., 1 mi. E. of Refugio, TD 6,452 ft., perf. 5,504-10 ft., IP 154 bbl. oil per day, 9/64-in. choke, 40° gravity, TP 725 psi.

### TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Gorman & McCaleb 1 Robert Linke, Martin Lawler Sur., dry, TD 4,217 ft.

Brazoria County: Clad B. Hammill 1 John Sharp et al, ACH&B Sur., A-403, dry, TD 7,585 ft.

De Witt County: Sunray Oil Corp. 1 Lundschen, Elijah Caples Sur., A-115, dry, TD 8,002 ft.

Goliad County: Dallas Husky 1 L. C. Fromme, Joseph Callahan Sur., A-81, dry, TD 4,950 ft.

Harris County: Production Service Oil Corp. 1 H. Zorn, W. Smith Sur., A-708, dry, TD 7,487 ft.

Jackson County: Alcoa Mining Co. 1 Sells et al, F. G. Keller Sur., A-37, dry, TD 9,106 ft.

Karnes County: H. H. Howell 1 Sidney S.


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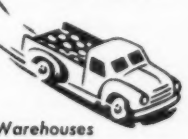

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Elmer F. Schmidt et al 1 Hugo H. Real, Kendall County School Land Sur., Lot 13, dry, TD 4,883 ft.

Victoria County: Pool & Stofer 1 Pickering, Four League Grant Sur., dry, 5,343 ft.

Martin Thompston 1 Davidson et al, Felix de Leon Grant, A-66, dry, TD 4,205 ft.

## Mississippi

### More Tests Announced for New Pollard Field

JACKSON.—In the new Pollard field, Escambia County, Alabama, Humble Oil & Refining Co. apparently has a dry hole at 1 Congleton, SE NW 17-1n-9e, located 1 mile east and one location south of the discovery well. The well was drilled to 6,100 ft. without finding the sands which produced in the discovery well. Coring for the lower Tuscaloosa producing sand was started at 5,880 ft. and continued to 5,930 ft. with recovery being hard, tight sand with streaks of shale. At this depth (—5,770 ft.) the well was approximately 25 ft. below the water level in the discovery well. Meanwhile, Humble has announced location for two more tests in the area. One is in SE NW 18-1n-9e, which is a direct south offset to the discovery well, and the other is in NE SE of the same section.

Approximately 4,100 ft. southeast of the one-well Gardens field, Adams County, B. Serio 1 C. C. Miller et al, 12-7n-3w, is running casing to test shows of oil in the Wilcox at 4,412-21 ft. Electric log and sidewall samples indicated oil sand at this interval, which is the approximate zone from which the discovery well was completed.

In the Paleozoic area of Mississippi, Union Producing Co. has set 5½-in. casing to 5,186 ft. in 1 J. T. Sanders, 22-15s-6e, Monroe County. While cleaning out this old abandoned strat test, operators dropped the drill pipe in the hole. The pipe was cleaned out to 5,215 ft. and hole had been cleaned out at the side of the fish to 5,270 ft. before operators decided to run casing. Perforations were effected at 5,081-82 ft. for a test of the cement job. On drill-stem test using ¼-in. top and ⅝-in. bottom chokes, top pressure built up to 32 psi. in 3 minutes, then decreased to 4 psi. in 15 minutes and to zero at the end of 30 minutes. Gas was to the surface in 8 minutes. When tool was pulled, recovery was 210 ft. of gas-cut mud. It is reported that perforations will not be squeezed at this time, but cement will be cleaned out to bottom and drill-stem test will be run of open hole below the casing.

Lion Oil Co. 2 Denkmann, 22-7n-4e, Rankin County, Mississippi, has been cored to 15,954 ft. and operator has released description of cores down to 15,914 ft. Core from 15,789-15,914 ft. was hard limestone with very little porosity or permeability. Poorly developed oolitic structure was noted in core at 15,874-15,914 ft. Commercial production has not been indicated in any formation penetrated.

**MISSISSIPPI WILDCAT FAILURES**

Adams County: John S. Callon 1 W. E. Montgomery, 66-6n-1w, dry, TD 7,025 ft.

Hinds County: Kingwood Oil Co.-Kemp Drilling Co. 1 E. L. Gray, 25-16n-5e, dry, TD 7,502 ft.

Perry County: A. R. Temple 1 Elmer C. Jordan, 23-3n-9w, dry, TD 9,153 ft.

Wilkinson County: Ashland Oil & Refining Co. and Calto Oil Co. 3 Crosby Lumber Co., 3-4n-2w, dry, TD 7,000 ft.

Gulf Refining Co. 10 Crosby Lumber Co., 26-3n-1w, dry, TD 7,602 ft.


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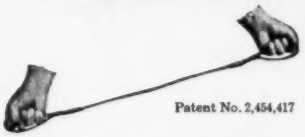

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### ALABAMA WILDCAT SUCCESS

Marion County: Gas discovery—Harry L. Cullet 1 McCarley-Bannister Unit, 23-11s-14w, TD 1,820 ft., open hole 1,805-17½ ft., IP 250,000 cu. ft. of gas per day.

# California

## San Ardo Extension to Be Completed in Aurignac

LOS ANGELES.—An extension well in process of being completed at the San Ardo field in Monterey County, coastal California, indicated production from the Aurignac sand will be continuous along the entire north flank of the field.

Located in NE SW 1-23s-10e the wildcat, Jergins Oil Co. 172 Orradre, is about ½ mile east and ¾ mile west of nearest Aurignac sand production. Completion of this link well would establish an east-west Aurignac production trend of almost 4 miles in length. Nearest production from the field's upper pay, the Lombardi sand, is about ½ mile south of 172 Orradre.

The extensioner topped the Lombardi at 2,060 ft., finding it wet as was anticipated, and drilled approximately 100 ft. of Aurignac pay before drilling into basement at 2,430 ft. With perforated liner set at 2,333-2,430 ft., the well was being completed as a pumper.

Northeast of the field Superior Oil Co. was under way with its 1 San Ardo-Government. Located in 33-22s-10e, the wildcat is about 1½ miles northeast of the company's six Aurignac producers in 6-23s-11e.

At its no-dope deep test in the Orcutt area of Santa Barbara County, Union Oil Co. was nearing the 10,000-ft. mark. The test, 13 Hartnell in 22-9n-24w, is expected to make a thorough test of Monterey shale possibilities, from which zone oil production is obtained in nearby West Cat Canyon and Santa Maria Valley. Union started 12 Hartnell, also in Section 22, last summer but finding its structural position unfavorable did not carry it to basement as planned.

Developments in the San Joaquin Valley region included a potential oil discovery about ½ mile west of the Kern River field. The wildcat, Standard Oil Co. of California 76-29 Kern County Land in 7-29s-28e, was pumping wash oil at last reports. Drilled to 2,000 ft. and with 7-in. casing set at 1,695 ft., the wildcat is separated from Kern River production by several dry holes.

At Arvin on the southeast end of the Valley, where five oil producers have been completed since the fields discovery last summer, activity has increased to four drilling operations. The Texas Co. was drilling 4 George southwest of the George discovery in 23-31s-29e,, and 1 mile to the northwest had 2 Kern Valley under way as a northeast offset to the extensioner. Havenstrite Oil Co. was completing 2 Richards as an east offset to 1 Richards in Section 22, while about ¾ mile east of production, in Section 23, C. B. Behr & Son was below 3,500 ft. at 1 Berge.

New valley wildcats announced included one in Fresno and Kings counties. The latter was Sunray Oil Corp. 36-13 Westlake Farms in 13-22s-19e, or about 9 miles east of Kettleman Hills. Approximately 4 miles northwest of Coalinga production, in 19-18s-15e, Max Pray and Elisha Walker will drill 58 "Well." The wildcat will be about ½ mile north of the operators' 74-19 well, abandoned a year ago at 5,937 ft.

In the Los Angeles region developments included the abandonment of two wildcats in the Castaic Hills area of upper Santa Clara Valley. The Texas Co. abandoned 1 Stanley, in 34-5n-17w, or about 1 mile west of Castaic Hills production, after drilling to 8,747 ft. Continental Oil Co. also abandoned 2 Rynne-Fisher, a northwest offset to the discovery, after reaching 8,973 ft.

### CALIFORNIA WILDCAT SUCCESSES

Kern County, new shallow pool in Blackwells Corner area: M. R. Peck 1-A Beer, SE NW 7-26s-19e, pumped 2 bbl. per day in open hole from shale zone topped at 110 ft., 11.2°-gravity crude, 0.1 per cent cut, TD 180 ft., elev. 576 ft.

Quarter mile west extension to Tunis Creek field: Standard Oil Co. of California 28-21 Tejon Ranch 3, SE SW 21-11n-18w, pumped 12 bbl. per day, through perforations at 1,305-12 ft., 22.5°-gravity crude, 20/64-in. bean, basement 2,000 ft., TD 2,007 ft., elev. 865 ft.

Santa Barbara County: 1½ miles north of west Cat Canyon field: General Petroleum Corp. 43-9 Houk, SE NW 9-9n-33w, pumped 250 bbl. per day through perforations at 5,880-6,528 ft., in Monterey shale, 9°-10°-gravity crude, 6.2 per cent cut, TD 6,528 ft., elev. 617 ft.

### CALIFORNIA WILDCAT FAILURES

Kern County, Blackwells Corner area: The Texas Co. 1 Occidental Land Co. NCT-1, 8-27s-20e, dry, TD 12,582 ft., elev. 649 ft.

Devils Den area: Yellowstone Oil Co. O-12-1 Still-Maybury, 1-26s-18e, dry, TD 457 ft.

Tejon Hills area: M. G. Kovaleski 1 Kova-Thom, 15-11n-18w, dry, TD 1,150 ft., elev. 1,036 ft.

Los Angeles County, Castaic Hills area: The Texas Co. 1 Stanley, 34-5n-17w, dry, TD 8,747 ft., elev. 1,661 ft.

Rosamond Lake area: C. W. Colgrove 11-9 Hughes, 9-8n-11w, dry, TD 5,576 ft., elev. 2,300 ft.

San Bernardino County, Kramer area: Jack Radovich 1 Radovich, 3-10n-5w, dry, TD 3,160 ft., elev. 2,250 ft.

Santa Barbara County, Carpinteria area: Imperian Gypsum & Oil Corp. 1 Bailard, 34-4n-25w, dry, TD 702 ft., elev. 135 ft.

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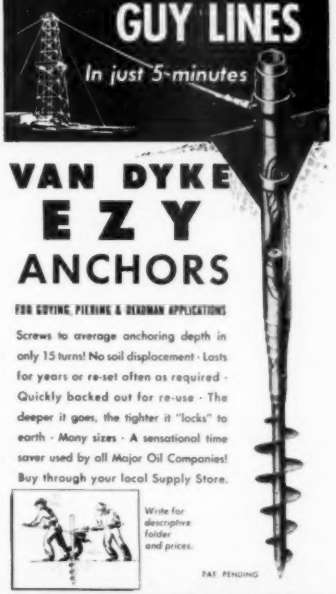

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## Rocky Mountain

### Discovery Completions Reported in Denver Basin

DENVER.—Three new discoveries have been completed in the Denver-Julesburg basin, to add impetus to the exploratory activity in this area. Shell Oil Co. completed 1 Rice, NW SW NE 28-8n-53w, in the South Springdale area, west of the town of Sterling, Logan County, Colorado, for a gage of 319 bbl. of oil daily through 24/64-in. choke. The well produces from the J sand between 4,870-75 ft., and the oil is 39° gravity. This is Shell's fourth discovery in the Dakota series sands in Logan and Weld counties. Shell 1 Williams, NW NW SE 30-5n-60w, in the Goodrich area, Morgan County, which has been testing for several weeks, was completed as a small discovery making 6 bbl. of oil daily on pump from the Dakota zone. Sinclair Oil & Gas Co. completed a J sand discovery in the Parke area at 1 Parke, NW NW NE 6-9n-52w, Logan County, for a gage of 330 bbl. of oil and 17 of water in 24 hours on swab. This well made oil on drill-stem test from that formation but there has been some delay in completion due to water difficulties. Exploratory drilling in the Denver-Julesburg basin has continued at a rapid rate through the winter, but there has been some slacking in development drilling.

Mountain Fuel Supply Co. of Rock Springs, Wyoming, is now testing at the Grizzly Butte 1 Unit, NE SE SW 35-15n-113w, wildcat south of Church Buttes, Uinta County, Wyoming, with the well at 13,370 ft., total depth. The operator has withheld all information but depths, but unofficial reports indicated casing has been cemented on the well. Numerous rumors have been circulated regarding shows of both oil and gas on the wildcat. At the present depth the well is believed to be in the Dakota-Lakota series sands, where gas is produced at around 13,000 ft. in the Church Buttes field. This portion of the Green River basin has been active, with two wildcats now under way by The California Co. on seismic highs east of the Church Buttes-Grizzly Buttes area.

At Teapot Dome, Wyoming, where production and drilling has been suspended for the past 25 years, the U. S. Navy has apparently made a new-pay discovery in the Tensleep formation. The well is 1-G-10, N½c SE 10-38n-78w, the first well below Sundance in the field. Tensleep was topped at 5,379 ft. and the Navy cored saturation in the formation. The best drill test was of the zone 5,426-61 ft. and in 30 minutes the operator recovered 2,780 ft. of black oil, 320 ft. of oily drilling mud, and 150 ft. of mud. The well is planned as a test to granite. The well is located on a Navy Reserve area where more than three and a half million barrels of oil was produced from 75 wells in the Shannon-Frontier formation prior to government shut down following the Teapot Dome scandal. Tensleep is productive in the Salt Creek field, adjoining Teapot on the north, and recent discoveries have been made in that formation throughout the southwest side of the Powder River basin.

In North Dakota two wildcats found water on tests, apparently not slowing the continued leasing and royalty buying play throughout the Williston basin. Amerada Petroleum Corp. 1 Halverson, C NE SE 26-152n-96w, in the Keene area south of Beaver Lodge pool, McKenzie County, made 30 ft. of oil and gas-cut mud and 150 ft. of black sulfur water on test of the zone 9,086-9,116 ft. Madison was topped at 8,959 ft. and the operator is now coring below 9,858 ft., with no further tests reported. North of Beaver Lodge, in the Tioga area, Williams County, Amerada this week cored good saturation at 1 Bakken, C SW NW 12-157n-95w. However, on drill-stem test 12,966-13,034 ft., probably in Devonian, the well made 5,600 ft. of slightly oil and gas-cut salt water. This well flowed oil on

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tests of the Madison, found at 8,305 ft. and has been carried on into Devonian for tests of the lower zone found productive in the Beaver Lodge field. Both wells are important exploratory tests for this region.

**COLORADO WILDCAT SUCCESSES**

Logan County, South Springdale: Shell Oil Co. 1 Rice, NW SW NE 28-8n-53w, TD 5,379 ft., PBTD 4,889 ft., flowed 319 bbl. oil in 24 hours, Timpas 4,247 ft., Greenhorn 4,486 ft., Muddy 4,759 ft., Dakota 4,859 ft., Lakota 5,243 ft., Morrison 5,354 ft.

Parke: Sinclair Oil & Gas Co. 1 Parke, NW NW NE 6-9n-52w, TD 4,860 ft., swabbed 330 bbl. oil, 17 bbl. water in 24 hrs., Niobrara 3,920 ft., Ft. Hays 4,205 ft., Carlile 4,283 ft., Greenhorn 4,403 ft., first sand 4,650 ft., Muddy 4,770 ft.

Morgan County, Goodrich area: Shell Oil Co. 1 C. E. Williams, NW NW SE 30-5n-60w, TD 6,953 ft., PBTD 6,546 ft., pumped 6 bbl. oil, 1 bbl. water per day, Codell 6,060 ft., Muddy 6,440 ft., Dakota 6,510 ft., Lakota 6,789 ft., Morrison 6,840 ft.

**COLORADO WILDCAT FAILURES**

Morgan County: Ellsworth Jordan et al 1 Newrock, NW NW NE 21-6n-59w, dry, TD 6,767 ft., Timpas 6,046 ft., Greenhorn 6,396 ft., D sand 6,562 ft., J sand 6,655 ft.

Phillips County: Sunray Oil Corp. 1-A Hotaling, W½ NE SW 27-9n-43w, dry, TD 5,715 ft., Blaine 3,970 ft., Chase group 4,450 ft., Shawnee 4,935 ft., Cherokee 5,521 ft., Pennsylvanian 5,670 ft.

**WYOMING WILDCAT FAILURE**

Natrona County, Goose Egg area: Kemmerer & Kemmerer 1 State, E½ SW NE 16-32n-81w, dry, TD 1,269 ft., Deadwood 1,046 ft.

**MONTANA WILDCAT FAILURE**

Blaine County, Bearpaw Mountain: The Texas Co. 1 Davis Ranch, C SE SW 4-29n-18e, dry, TD 4,925 ft., Three Forks 4,000 ft., Potlach 4,057 ft., Jefferson 4,170 ft., Cabrian 4,915 ft.

**UTAH WILDCAT FAILURE**

Uintah County, Oil Springs: Continental Oil Co. 2 Unit, NW NW SW 18-12s-25e, dry, TD 2,667 ft.

**WESTERN NEBRASKA WILDCAT SUCCESS**

Cheyenne County, Olson area: Ohio Oil Co. 1 Kugler, NW NW NE 5-14n-48w, TD 4,625 ft., pumped 129 bbl. oil per day, first Dakota 4,386 ft., second Dakota 4,446 ft., third Dakota 4,530 ft.

**WESTERN NEBRASKA WILDCAT FAILURES**

Cheyenne County, Huntsman: Ohio Oil Co. 3 Pahl, NW SW NW 7-14n-49w, TD 7,206 ft., temporarily suspended, second Lakota 5,036 ft., third Lakota 5,105 ft., Morrison 5,212 ft.

Morrill County: Fisher & Stout 1 fee, NW SW NW 35-18n-50w, dry, TD 5,002 ft., J sand 4,520 ft., Dakota 4,708 ft., Morrison 4,971 ft.

R. C. Gangwer 1 Beskas, SW NW SW 30-19n-49w, dry, TD 4,000 ft.

Simmons & Bonney 1 Beyer, SW SW SW 18-20n-50w, dry, TD 4,132 ft., Greenhorn 3,603 ft., first sand 3,897 ft., Muddy 4,053 ft., Skull Creek 4,102 ft.

**NORTH DAKOTA WILDCAT SUCCESS**

Williams County, Significant extension: Amerada Petroleum Corp. 1 North Dakota "A," C NE SE 16-156n-95w, TD 8,595 ft., flow 521 bbl. 52.4°-gravity oil in 24 hrs., with 640 M.c.f. gas per day, Charles salt 7,574 ft., Madison 8,241 ft., Madison pay 8,435 ft.


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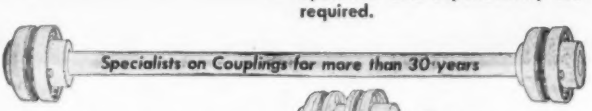

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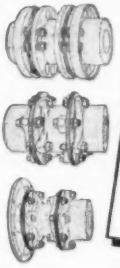

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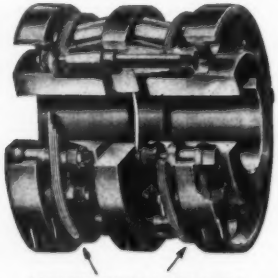

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## South Louisiana

### Oil Strike Completed in Little Lake Gas Field

NEW ORLEANS.—Humble Oil & Refining Co. has completed 1 Louisiana Land & Exploration Co. "F" as an oil discovery in the one-well Little Lake gas field, Jefferson Parish. From perforations at 11,276-79 ft., the well flowed 297 bbl. of oil per day through ⅛-in. choke. Gravity of the oil was 37.1° and tubing pressure registered 2,850 psi. The well was drilled to total depth of 12,118 ft., cased with 7-in. oil string to 11,836 ft. and plugged back to 11,500 ft. On previous tests, the well produced salt water from 11,678-11,780 ft., and 11,522-34 ft. From perforations at 11,536-39 ft., the well flowed at the rate of 245 bbl. of 36.8°-gravity oil through ⅛-in. choke.

Little Lake field was discovered in 1947 at Gulf Refining Co. A-1 Louisiana Land & Exploration Co., 5-18s-23e. The well flowed 69 bbl. of condensate daily from perforations at 9,889-94 ft. Three subsequent tests by Gulf to confirm production in the area failed.

The California Co. has completed 1 State Lease 1958, wildcat in the Battledore reef area off the coast of Plaquemines Parish. On test, the discovery flowed at the rate of 178 bbl. of 29°-gravity oil daily from perforations at 7,528-32 ft. Flow was gaged through ⅛-in. choke. Previous tests at 8,211-16 ft. and 8,190-96 ft. failed to produce commercially. Hole is bottomed at 10,000 ft. with 7-in. pipe cemented at that depth.

In the same general area, Shell Oil Co. has plugged and abandoned 1 State Lease 1496, located off St. Bernard Parish in Breton Sound. It was previously announced that testing would get under way at this wildcat. The test was abandoned at total depth of 10,005 ft. Shell immediately staked location for a new test approximately 2,000 ft. northeast of the dry hole.

Meanwhile, Shell is tied up with a fishing job at its Marsh Island well in Iberia Parish, 1 State Lease 1814. An interesting sand body was encountered at 14,780-14,840 ft. Operator is fishing at 15,003 ft.

Magnolia Petroleum Co. has had packer trouble at 1 Four C Unit, wildcat in 32-3s-9w, Beauregard Parish. Packer set at 14,190 ft. failed and a second packer set to 13,128 ft. also stuck in the hole. Operator is now preparing to run packer again, prior to testing at 14,228-38 ft.

**SOUTH LOUISIANA WILDCAT SUCCESS**

Orleans Parish: Oil discovery—"Shell Point" —The Texas Co. 1 State Lease 1897, Shell Point, 11s-15e, TD 10,084 ft., perf. 9,900-25 ft., IP 96 bbl. oil per day, 8/64-in. choke, TP 800 psi., 46.1° gravity.

**SOUTH LOUISIANA WILDCAT FAILURES**

Avoyelles Parish: W. A. Moncrief 1 Lake Pearl Co., 31-1n-4e, dry, TD 10,033 ft.

Plaquemines Parish: The California Co. 3 Louisiana State Lease 1784, dry, TD 10,505 ft.

Terrebonne Parish: The Texas Co. A-2 Continental Land & Fur Co., 12-18s-15e, dry, TD 11,000 ft.

Washington Parish: N. B. Hunt 1 Nelos Johnson, 20-3s-11e, dry, TD 11,442 ft.

## Eastern Texas

### Two Offsets Staked at Harrison County Discovery

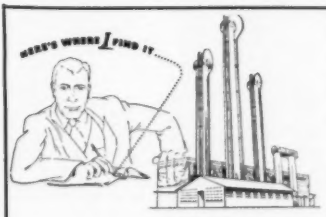
DALLAS.—Harrison County's big gas-distillate discovery, (see completions below), had two offsets staked this week. Tom Potter 2 Cock was located on a 52-acre tract north of the discovery in the William Watson Survey. Potter 1 Laura Shaw estate, third test for the area, is a ½-mile southwest offset in the J. R. Pace Survey.

Two shallow wildcats have been scheduled for Navarro County. J. L. Collins & Co. filed to drill 1 Irene Stockton on a 100-acre lease in the Powers Survey, 7 miles south of Kerens. Contract depth was 3,500 ft.

Thompson Brothers 1 Thompson & Milburn, John Peoples Survey, within the city limits of Corsicana, was projected to 1,200 ft.

Byars & Kurth 1-A Angelina Lumber Co., Angelina County discovery southeast of Lufkin, completed for an initial potential of 87 bbl. of oil a day on ⅛-in. choke from perforations in the Wilcox at 3,938-40 ft.

Anco Gas Corp. 1 M. E. Jackson heirs, Anderson County deep test, was drilling in lime and shale at 9,884 ft. Last reported test from 8,963-93 ft. developed 90 ft. of free oil.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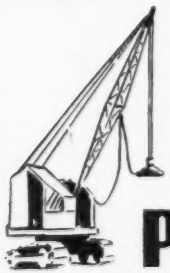

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Pure Oil Co. 1 J. A. Wright, Freestone County wildcat, was testing on perforations at 7,219-7,392 ft. Total depth was 8,023 ft.

**EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT SUCCESS**

Harrison County: Tom Potter 1 W. T. Cock, J. R. Davis Sur., 9 mi. S Hallsville, TD 6,800 ft., elev. 241 ft., Pettit 6,504 ft., perf. 6,678-88 ft., IP 1,350 bbl. 72°-gravity distillate, with 30,000,000 cu. ft. gas.

**EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES**

Denton County: Aubrey-Tennant Oil Co. 1 J. R. Jones, John Shipley Sur., A-1,178, dry, TD 2,460 ft.

Henderson County: Coffield & Guthrie 1 Primrose, I. V. Michelli Sur., dry, TD 4,503 ft.

Hunt County: Creslenn Oil Co. 1 Boles Orphans Home, A. Lyday Sur., dry, TD 5,028 ft., Woodbine 3,210 ft., Paluxy 4,980 ft.

Kaufman County: T. D. Humphrey 1 M. V. Smith, J. R. Taylor Sur., dry, TD 6,719 ft.

Smith County: Magnolia Petroleum Co. 1 V. H. King, J. H. Sanders Sur., dry, TD 6,000 ft., Nacogdoches 2,510 ft., Austin chalk 4,655-4,920 ft.

# Permian Basin

## Prospects Good for New Strike in King County

MIDLAND.—Prospects for a new discovery in northern King County were good as Stanolind Oil & Gas Co. and Ard Drilling Co. 14 Masterson developed 1,980 ft. of clean oil on a 2-hour test in Bunger sand at 4,089-4,100 ft.

The well found water in the Cisco lime at 3,940-75 ft., then drilled into the sand around 4,081 ft. First test at 4,081-88 ft. developed 2,600 ft. of oil and 150 ft. of oil-cut mud in 2 hours. Location is in the Sam Lazarus Survey, some 10 miles northeast of Guthrie.

A Canyon reef exploration has been staked for the southwest corner of King County at Continental Oil Co. 4 Mary A. Martin in 175-F-H&TC. Contract depth was 6,800 ft. and location is about 2 miles southwest of three dry holes previously drilled by Continental.

In Runnels County, American Trading & Production Co. 2 E. W. Bridwell, 7 miles southwest of Crews, developed 240 ft. of free oil on a 54-minute test at 2,463-70 ft., and 300 ft. of oil on a 41-minute test at 2,492-96 ft. Operators were coring ahead.

Honolulu and Signal released location for a 10,000-ft. wildcat in Hockley County. The new test is the 1 T. H. Matthews, 5 miles northwest of Ropesville in 11-13-B, Howard County School Lands.

Forest Oil Corp. 1-A University, 12-30-University Lands, Crane County wildcat, headed 22½ bbl. of new oil in 5 hours and died, from Pennsylvanian lime at 9,149-69 ft. After further acid treatment of the same perforations, the well gaged 87.7 bbl. of fluid in 7 hours, of which 75 per cent was oil and the balance acid water. It was still flowing at last report, and operators said the pay section may be the Wolfcamp.

Magnolia Petroleum Co. 18 Katie Lea, Crane County wildcat in 22-32-PSL, plugged back to 7,007 ft. from 10,932 ft. after swabbing 12 bbl. of new oil in 24 hours from perforations at 7,490-7,620 ft.

In the Flat Rock field of southeast Upton County, Cities Service Oil Co. and Continental Oil Co. 2 University finished as an Ellenburger well, flowing 313 bbl. of high-gravity oil a day through 11/64-in. choke. Pay section was between casing seat at 10,699 ft. and 10,747 ft., total depth.

The new well is the only Ellenburger producer in the field, and an east offset to the discovery which had Ellenburger oil but went to water and was plugged back to recomplete in the Spraberry. Three other tests were drilled in the field and completed as Spraberry wells.

On the north side of the Wilshire field, Wilshire Oil Co. 24-130 McElroy Ranch flowed better than 100 bbl. of oil an hour on drill-stem test from 12,080-12,227 ft. Location is in 130-D-CCSD&RGNG, 1 mile north and west of Sinclair's discovery.

Farther north of the Wilshire field, in Section 132, Sinclair 6 McElroy swabbed load oil and acid water after washing the Pennsylvanian at 9,810-25 and 9,855-75 ft. Recovery was 16 bbl. of new oil and 1 bbl. of load oil.

In Terry County Joseph O'Neill 1 Lyons, southeast extension try to the Wellman Wolfcamp reef field, reported top of the reef at 9,940 ft., drilling soft to 9,950 ft. Drill-stem test at 9,938-50 ft. recovered 240 ft. of mud with no shows. Lime with oil stains was cored from 9,950-60 ft. and a test was being made of the section.

Superior Oil Co. 4-16 Windham, Midland County wildcat, had casing set on bottom at 10,681 ft., in the Pennsylvanian. The well had a good gas show on drill-stem test below 10,143 ft. and operators were to drill out and retest that section.

**WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT SUCCESSES**

Martin County: Deep Rock Oil Corp. 1 McWhorter, 31-35-T1N-T&P, TD 7,850 ft., elev. 2,617 ft., Spaberry 6,910 ft., pay 7,800 ft., IP pumped 11 bbl. 39°-gravity oil.

Reagan County: King, Warren & Dye 1 Whitehoues, 29-36-T5S-T&P, TD 7,665 ft., elev. 2,717 ft., Spraberry 6,650 ft., pay 7,582 ft., IP 519 bbl. 38°-gravity oil a day, ½-in. choke, TP 175 psi., GOR 1,085 cu. ft.

Runnels County: Restal Drilling Co. 1 Williams, L. D. Counts Sur., 4½ mi. S Lawn, TD 4,276 ft., elev. 2,234 ft., Gardner 4,210 ft., pay 4,226-32 ft., IP 81 bbl.


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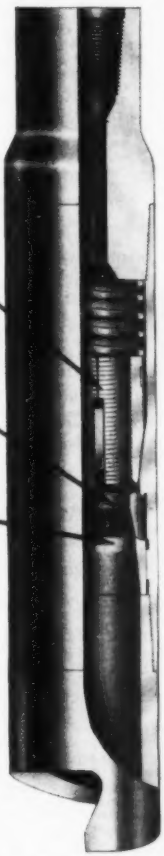

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And since each segment is "keyed" to the bowl so that the slips will not rotate within the body, torque can easily be applied to the fish, if desired, to facilitate recovery.

**POSITIVE PACK-OFF:** To permit full circulation through the tool, the "OK" Overshot incorporates a pack-off rubber positioned *below*—not above—the slip segments.

This feature not only permits maintaining a positive pack-off as long as the slips are engaged on the fish, but also assures the pack-off rubber making its seal a sufficient distance below the top of the fish to clear any distorted, out-of-round, or split pipe sections that may be present near the top portion of a twist-off. This, coupled with a separate pack-off for each bowl diameter, reduces to a minimum any risk of pack-off failures. *If you can grip the fish you can pack it off!*

**And here's another important feature.** Note that the pack-off rubber is held in place by a steel gland. This gland projects sufficiently beyond the internal diameter of the bowl to center the fish, thus protecting the pack-off rubber against abnormal compression as well as protecting the slips against damage from a misaligned fish. This gland can be either plain, as shown, or can be provided with a milling surface on its inside taper to smooth up minor, but troublesome burrs and rough edges on the top of the fish before it enters the packing rubber.

### QUICK, FOOL-PROOF OPERATION

Operation of the "OK" Overshot is as simple and trouble-free as its design. Simply run the tool into the hole—either attached directly to the run-in string, or with a section of casing above it to permit gripping farther down the fish than normally. As the tool is lowered over the fish, the flexibly mounted slips expand to permit the pipe to enter the bowl. Then the run-in string is simply raised, whereupon the tapered slips, forced downward by the coil spring, *automatically* take a firm, uniform grip on the fish. *It's as simple as that—no complicated operations or setting procedures are necessary!*

Release—if desired—is equally positive. Merely let off strain on the run-in string, then rotate the string in a screwing direction as it is slowly raised. Since the slip wickers are cut in a spiral design (like a thread), continued rotation unscrews the tool from the fish for quick, complete release!

### WIDE ADAPTABILITY TO VARYING REQUIREMENTS

**The "OK" Overshot is readily adaptable to a wide range of operating requirements . . .**

▶ Two or more "OK" bowls are available connected together, as shown at left, for catching varying diameters. The bowl to fit the largest diameter is, of course, at the bottom—that to fit the smallest, at the top.

▶ Various types of top connections are available: (1) Short Type (overshot to drill pipe) . . . (2) Long Type with slip and elevator recess (overshot to drill pipe) . . . and (3) Regular Type (overshot to casing).

▶ Where extensive milling is necessary—more than that within the scope of the milling type packing gland—the Guide at the bottom of the tool can be replaced with a heavy-duty Milling Shoe.

▶ When the fish has fallen into a cavity in the side of the hole, the Guide can be replaced with a Wall Hook to catch and straighten the fish for easy engagement.

▶ When operating in a hole with a diameter considerably larger than the Overshot, an Oversize Guide can be substituted for the regular Guide to assist centering the fish into the tool.

**AVAILABLE IN A COMPLETE RANGE OF SIZES**

the Baash-Ross "OK" Overshot can be used for recovering virtually any size of pipe that may become lost in the hole. See your nearby Baash-Ross representative for complete details—or write direct!

AVAILABLE THROUGH LEADING SUPPLY STORES

42°-gravity oil, ¼-in. choke, TP 125 psi., GOR 800 cu. ft.

**WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES**

Andrews County: Imperial Petroleum Co. 1-A Crenshaw, 9-A46-PSL, TD 5,900 ft., elev. 3,215 ft., San Andres 4,380 ft., Glorietta 5,670 ft.

Crane County: Richardson & Bass 1 Mellie Harris, 7-1-H&TC, dry, TD 6,285 ft., elev. 2,411 ft., Joins 6,164 ft.

Crockett County: Jack Woodward 1 University, 25-30-University, dry, TD 8,174 ft., elev. 2,331 ft., Ellenburger 7,358 ft.

Pure Oil Co. 1 Ed Bean, 88-OP-GC&SF, dry, TD 1,490 ft.

Garza County: Sohio Petroleum Co. 1-B Swenson, 59-2-H&GN, dry, TD 7,510 ft., elev. 2,289 ft., Canyon reef 6,870 ft., Strawn 6,910 ft., Caddo 7,365 ft.

Lynn County: DeKalb Agricultural Association 1 F. B. Terry, 518-1-GC&SF, dry, TD 4,150 ft., elev. 3,092 ft., San Andres 3,485 ft.

Runnels County: Swap Oil Co. 2 Ed Lindermann, Austin & Williams Sur. 263, dry, TD 3,940 ft., elev. 1,750 ft., McMillan 2,500 ft., Gardner 3,836 ft.

Miami Operating Co., Inc., 1 E. C. Shroeder, Sec. 342, J. Mitchell Sur., dry, TD 4,869 ft.

Schleicher County: Gray-Wolfe Co. 1 Margaret Hicks, 72-M-GC&SF, dry, TD 5,858 ft., elev. 2,422 ft., Canyon 4,782 ft., Strawn 5,704 ft.

Tom Green County: Schkade & Bullock 1 Blaylock, Sec. 2, F. M. Condron Sur., dry, TD 431 ft.

The Texas Co. 1 Irene Sparks, P. C. Lee Sur. 2, dry, TD 479 ft.

**TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURES**

Armstrong County: Hassie Hunt Trust 2 J. A. Cattle Co., Sec. 84, V. S. Terry Sur. 2, dry, TD 4,186 ft. in the Wolfcamp, elev. 2,718 ft.

Oldham County: Superior Oil Co. 6 Matador Land & Cattle Co., League 240, 21 mi. N Vega, dry, TD 6,355 ft. in the Pennsylvanian, elev. 3,508 ft.

**SOUTHEASTERN NEW MEXICO**

Southern production Co. 1-A State, wildcat in 2-11s-37e, placed sample top on the Devonian at 11,620 ft., said to be some 200 ft. low to The Texas Co. 1-AR State, of which it is an east offset. Drill-stem test in the Devonian from 11,779-11,823 ft., open 1 hour, developed 2,460 ft. of oil and gas-cut mud, estimated to be 50 per cent oil. It was coring ahead.

A deep exploration in the shallow Hobbs field has given the area prospects of oil from the Abo section of the Wolfcamp. Stanolind Oil & Gas Co. 11-X-A1 State in 4-19s-38e. Drill-stem test from 7,218-7,320 ft. had a good volume of gas in 7 minutes and recovered 1,100 ft. of 41°-gravity oil. It was drilling ahead on a 9,000-ft. Ellenburger contract.

Sinclair Oil & Gas Co. 1 Roy Barton, 23-21s-37e, will try for Ellenburger production in the Drinkard field of southwest Lea County. Operators expected to reach the Ellenburger above 8,000 ft.

Buffalo Oil Co. 12-B Baish, Devonian discovery in the Maljamar field, was still flowing to clean and making 20 bbl. of oil an hour, with some fresh water still showing.

Jackson, Douglas & Ritchie 1 State, northwest Lea County discovery, was shut in for storage after flowing an estimated 20 bbl. of oil an hour. Completion was to be made from perforations at 8,390-8,450 ft.

Second Abo producer in the Lovington area has been completed at Skelly Oil Co. 3-Q State, 31-16s-37e. Potential was 874 bbl. of oil a day through 42/64-in. tubing choke from pay between 8,370-8,430 ft.

**SOUTHEAST NEW MEXICO WILDCAT FAILURES**

Eddy County: J. S. Curtis and R. Nix 1 Curtis-Federal, 27-19s-27e, dry, TD 2,008 ft.


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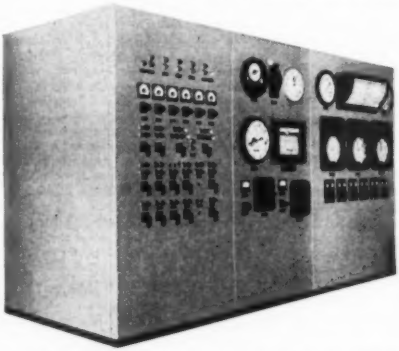

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# Louisiana-Arkansas

## New Discovery Looms In Grant Parish

SHREVEPORT.—A new oil or gas field is indicated for Grant Parish at Gulf Refining Co. A-1 Colfax Lumber & Creosote Co., Inc., NW NW 36-8n-5w. The wildcat, drilled by Crow Drilling Co., is located southeast of Colfax and northwest of Montgomery.

Oil and gas shows have been found in the Wilcox sand at 3,448-78 ft. Bottom is at 4,013 ft. in the Wilcox. Sidewall samples were taken and Schlumberger log made. In preparation for completion tests 7-in. casing has been run. No drill-stem test of the zone was made. Pipe will be run to near 3,500 ft.

There is no other immediately close Wilcox production, and the zone appears to be part of the Wilcox trend extending from south East Texas to Adams, Wilkinson, Jefferson, Amite, and Franklin counties in Mississippi. The majority of Wilcox fields are small and produce from stringer sands. More drilling is necessary to determine the limits of the Wilcox sand in Grant Parish. It is reported that the wildcat lies between two dry holes.

Lion Oil Co. 1 Maynard, 330 ft. from EL & 88 ft. from SL NW 24-18n-12w, Bossier Parish venture, has been dually completed from Jeter perforations between 4,504-20 ft., 4,530-48 ft., and 4,433-50 ft. The well is an indicated 2-mile northeast extension to Sligo field, located just north of Barksdale Air Force Base.

From perforations 4,433-50 ft. well flowed at rate of 5,000 M.c.f. of gas daily through

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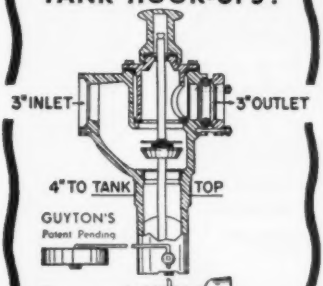


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⅜-in. top and ⅝-in. bottom chokes when first perforated.

Hole is bottomed at 5,830 ft. in Travis Peak and pipe cemented at 5,510 ft.

**Arkansas.**—Flow continues to decline at McAlester Fuel Co. A-1 Sam J. McCollum, 22-19n-21w, Columbia County wildcat. The new Pettit lime producer was gaged at 71 bbl. of oil daily, with gas-oil ratio of 454 to 1. Well may have to be acidized if flow continnues to decline.

A new oil field has been opened in Lafayette County at The California Co. 1 Burton, C NE NE 9-18s-23w, 3½ miles northwest of Bussey. Well flowed 5 bbl. of 42°-gravity oil hourly from perforations at 7,342-52 ft. in the Cotton Valley. Total depth is 9,564 ft.

**LOUISIANA WILDCAT FAILURE**

Morehouse Parish: Southwest Gas Producing Co. 1 W. T. Carpenter, 1,925 ft. N and 1,512 ft. E SWc Sec. 1 in Sec. 37-20n-6e, dry, TD 4,906 ft.

## Southwest Texas

### Duval County Wildcat Completed for Gas

CORPUS CHRISTI.—Salt Dome Production Co. 1 Eusebio Vidal et al, wildcat in Duval County, has been completed for 6,300,000 cu. ft. of gas per day plus 11 bbl. of 58.6°-gravity distillate per million cubic feet. Production is from the Pettus at 4,532-34½ ft. The new strike is located in Augustin Cantu Survey, Abstract 1051.

A new gas-distillate discovery in Hidalgo County is indicated at Houston Oil Co. of Texas and American Republics Corp. 1 Temple W. West, located 5 miles east of Sam Fordyce field. The well cored 27 ft. of gas sand and operators tested the upper section of that sand. On a 15-minute drill-stem test at 5,998-6,004 ft., using ¼-in. chokes, recovery was 4½ ft. of distillate. Working pressure was 715 psi. and bottom-hole pressures were 1,750 and 2,825 psi. Silty shale with slight gas odor had been cored at 5,997-6,002 ft.; sand and sandy shale with gas odor at 6,002-04 ft. At last report, crews had cored to 6,024 ft. in sand with gas odor and were coring ahead.

In new oil producing area southeast of Temple in Bell County, Pryor Dillard B-1 A. H. Safford found shows in Georgetown lime around 1,210 ft. and at last report was drilling at 1,240 ft. due to test the Edwards lime. This well also had good oil shows in Buda lime at 1,085-90 ft. It is located ¼ mile southwest of Dillard 1 W. E. Simek, Buda oil producer. Both wells are located in Silliam Woodford Survey 403.

In Jim Hogg County, H. L. Hunt 2 Lawrence R. Brooks, cored shaly sand with gas and oil odor at 3,680-85 ft. and firm sand with gas and oil odor and good fluorescence at 3,685-90 ft. Operator has set pipe at 3,700 ft. and is preparing to test the shows.

Two and one-half miles east and a little north of Pearsall in Frio County, Tri-Mark Oil Co. 1 Federal Royalty Co., had oil shows on drill-stem test at 3,927-62 ft. and is now drilling ahead due to core for the Olmos sand at 4,210 ft. First drill-stem test at 3,927-62 ft., using ¼-in. and 1-in. chokes, recovered 90 ft. of oil-cut mud. There was a strong blow at the surface and bottom-hole pressures were 145 and 540 psi. On a second test of the same interval, using same chokes, there was no surface pressure and recovery was 50 ft. of slightly oil-cut mud and bottom-hole pressures were zero and 450 psi.

**SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT SUCCESS**

Kenedy County: Gas discovery—Humble Oil & Refining Co. 2 King Ranch-San Jose Parral, San Juan de Carricitas Grant, TD 8,768 ft., perf. 8,675-90 ft., IP 23,200,000 cu. ft. of gas per day, open flow, TP 3,565 psi.

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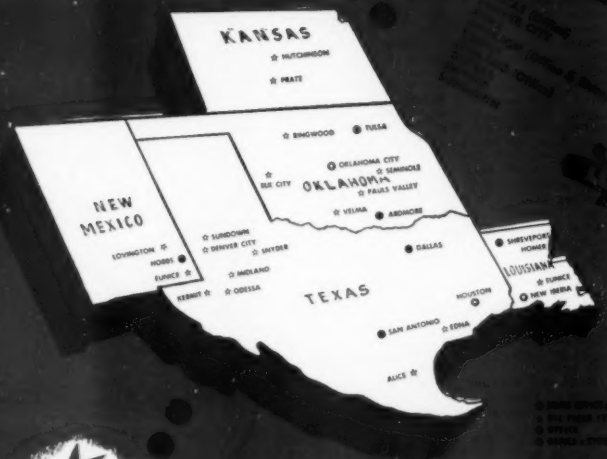

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**SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES**

Atascosa County: J. E. Hillier 1 C. S. Slatten, J. H. Dosey Sur., A-1,153, dry, TD 2,230 ft.

Bastrop County: Stanley A. Thompson 1 Chas. Wolfe, James Doyle Sur., dry, TD 1,205 ft.

Duval CoCunty: John F. Camp & Sons et al 4 Clara Driscoll, SEPI&M Sec. 49, A-197, dry, TD 3,342 ft.

Continental Oil Co. 1 J. T. Dinn, H. K. Allison Sur. 456, A-1,808, dry, TD 3,513 ft.

Jake L. Hamon, Edwin L. Cox, Geo. H. Coates D-3 Clara Driscoll, Santa Rosalia Grant, Sec. 70, dry, TD 3,130 ft.

Taylor Refining Co. 1 John M. Luby, A. J. Rider Sur. 148, A-1,312, dry, TD 6,015 ft.

Frio County: Alaska Steamship Co. 1 W. H. Gifford Est., Frio County School Land Sur., League 20, Blk. 40, dry, TD 5,077 ft.

Parker Development Co. 1 S. A. Brewster et al, TC RR Co. Sur., A-981, dry, TD 6,250 ft.

Guadalupe County: Bay City Drilling Co. 1 Max L. Webb, Benk Fuqua Sur., A-22, dry, TD 2,933 ft.

La Salle County: J. E. Douglas et al 1 M. W. Miller, I&GN RR Co., Sec. 19, Blk. 2, dry, TD 2,515 ft.

Zapata County: Long Bros. and Sid Katz B-1 Alice Doran Haynes, Los Mogotes and Los Venados Grant, dry, TD 3,125 ft.

# Canadian Fields

## Oil Discovery Seen for Twining-Three Hills Area

CALGARY.—This week brought indications of oil or gas success at a wildcat and four extension wells being drilled in western Canada, including four in Alberta and one in Saskatchewan. Two of those wells found oil, while the other three yielded natural gas.

The Anglo-Socony 1 Twining wildcat in the Twining-Three Hills area of southern Alberta has discovered oil in a Devonian section, and after a small acid treatment yielded water-free oil at the rate of around 100 bbl. daily.

The Twining wildcat showed its first Devonian oil encouragement during January when it recovered mud-oil emulsion, with patches of free oil. Hole was carried down to 8,200 ft., plugged back to 7,597 ft. and 7-in. casing was set at 7,400 ft. Prior to production testing there were 240 perforation shots applied to the formation between 7,408-82 ft. in an effort to fracture that section. About 750 gal. of acid was then applied.

When tubing was opened for the test the well started returning acid water and flowed a little oil and gas by heads. Production was turned into the separator on February 15, and production rate was about 100 bbl. of 38° to 39°-gravity water-free crude oil daily. The natural-gas flow rate was small, and ranged from zero to 500,000 cu. ft. daily. Company officials state that plan is to apply additional acid and continue production tests.

The discovery well is located on LSD 8, 9-31-24w4, about 45 miles northeast of Calgary. Late last fall the Twining well gave some oil showings in the Madison and also yielded a small flow of natural gas from that formation.

The other oil strike was made in the Bashaw area of central Alberta, at a step-out venture located 2 miles south of previous oil wells in that region. This indicated extension or discovery of a new pool was made at Bashaw 1 Arl, which is located on LSD 9, 19-41-22w4. Drill-stem test in D3 Devonian zone, from 5,562-69 ft., gave a recovery of 190 ft. of oil and a gas flow rate of 50,000 cu. ft. daily. A test 6 ft. deeper gave up some gas and oil plus saltwater. Production string of casing has been set, and hole will be perforated opposite the water-free oil pay section for production tests.

In the Clive area, 95 miles north-northeast of Calgary and 14 miles northeast of Lacombe, the British American Oil Co., Ltd., and Cities Service Petroleum Co. team discovered natural gas in the Viking sand. This gas discovery well, B.A-Cities Service 2 Clive, on LSD 16, 17-40-24w4, is ¼ mile west of the D2 Devonian oil discovery made by B.A. and Cities Service last year. Gas flow rate in the Viking during drill-stem test at 4,659 ft., was in excess of 1,000,000 cu. ft. daily. Hole will be carried down to its original objectives, the Cretaceous and Devonian.

Canadian Delhi Oil, Ltd., made a major extension to the Lac la Biche natural gas area this week, when its exploratory well located 6½ miles from previous gas wells in the area flowed at the rate of 2,800,000 cu. ft. daily. The new gasser, Canadian Delhi 2 Lac la Biche on LSD 4, 26-68-13w4, found its production during drill-stem test at the shallow depth of 851 ft. The producing formation is the Pelican sand, or Viking sand equivalent.

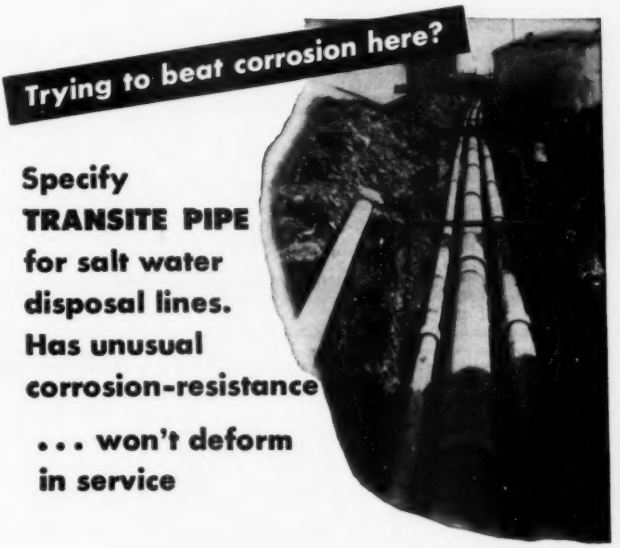
This gas extension was made at Canadian Delhi's second venture in a planned eight-well program at Lac la Biche. This gas region is located around 75 miles west of the Saskatchewan border and 110 miles northeast of Edmonton.

The Saskatchewan extension this week was recorded at the Husky Oil & Refining Ltd.-Phillips Petroleum Co. team's joint project in the Brock area. The new success, located ¾ mile north of previous gas wells, is Husky-Phillips 4 Brock, on LSD 6, 33-28-20w3. Drill-stem test in the Viking gave a gas flow rate of 4,500,000 cu. ft. daily. Production casing has been set at that well, and rig will be shifted for drilling at a further venture in the team's development and exploratory program in the area.

**CANADIAN WILDCAT FAILURES**

Deep Rock 1 Bullpound, LSD 8, 10-23-14w4, TD 4,552 ft.

Imperial-Home 1 Duhamel, LSD 4, 8-46-21w4, TD 5,648 ft.

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Bailey 1 Pearce, LSD 13, 25-10-25w4, TD 6,450 ft.
Red Pic-Petrol-Dragon 1 Sibbald, LSD 9, 2-28-3w4, TD 3,247 ft.
Sweetgrass-Maygill 2 Matlo, LSD 7, 27-21-12w4, TD 4,030 ft.

# North Central Texas

## Gardner Sand Strike Completed in Taylor County

WICHITA FALLS.—Saxon Oil Co. 1 Gulf, Colorado & Santa Fe, Taylor County wildcat, was reported as completed for a Gardner sand discovery, making 140 bbl. of oil in 16 hours on completion test. The flow was through 12/64-in. choke. Pay was around 3,900 ft.

Luke Grace Drilling Co. 1 Milam, conglomerate discovery southeast of Ringgold, was flowing 12 bbl. of oil an hour from open hole at 5,635-53 ft. and through 15/64-in choke.

The same operators spotted location for the 1-B Milam in Section 54, Abel Beason Survey.

Tom B. Medders 1 E. Egenbacher, wildcat prospect in Section 90, Hill County School Lands, Montague County, was conditioning hole to test at 6,098-6,111 ft. after the tool plugged on a drill-stem test.

S. D. Johnson 1 G. T. Rater, 5 miles south of Shannon in Jack County, developed 2,150 ft. of clean oil on a 1-hour drill-stem test in sand from 3,240-45 ft. Operators set casing at 3,291 ft. for completion. Drilling was under way for the operator's 2 G. T. Rater as a confirmation well.

Standard Oil Co. of Texas announced location for a 7,500-ft. wildcat in Montague County, 3 miles west of St. Jo. Location was made for the 1 L. T. Mosley in the M. B. Lewis Survey, A-424. Elevation was estimated at 850 ft.

R H K Drilling Co. 1 Willingham, Fisher County wildcat, was testing in the reef limestone from 4,984-5,003 ft. The 1 Willingham encountered a heavy flow of gas after setting casing at 4,984 ft. and blew out of control for several weeks.

Continental Oil Co. 1-248 Mary Earwood, wildcat northeast of Blackwell in Nolan County, topped the Canyon reef at 4,642 ft. Drill-stem test from 4,643-59 ft. recovered 30 ft. of drilling mud, and at 4,659-79 ft. recovery was salty, sulfur water.

### NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT SUCCESSES

Baylor County: Cosden Petroleum Corp. 1-A Parkey, Sec. 9, A-68, BBB&C, TD 4,965 ft., perf. 4,940-52 ft., IP 160 bbl. 43°-gravity oil, 14/64-in. choke, TP 190 psi., GOR 1,000 cu. ft.

Clay County: Deep Rock Oil Corp. 1 R. L. Brixey, Sec. 24, WCRR Sur., TD 5,972 ft., elev. 981 ft., pay 5,473 ft., IP 143 bbl. 44°-gravity oil, 18/64-in. choke, TP 140 psi., GOR 648 cu. ft.

Coleman County: Howsley 1 Sappington, Sec. 12, T&NO Sur., TD 3,439 ft., elev. 2,066 ft., Jennings sand pay 3,424 ft., IP 306 bbl. 39°-gravity oil, ¼-in. choke TP 325 psi., GOR 275 cu. ft.

Eastland County: J. W. Tuttle 1 Houston Brashear, William Van Norman Sur., TD 1,326 ft., IP pumped 8.6 bbl. 39°-gravity oil.

Jones County: French M. Robertson 1 Lettie C. Scott, T&NO Sur., 3 mi. N Nugent, TD 2,227 ft., pay 2,217 ft., IP pumped 121 bbl. 37°-gravity oil.

Montague County: Hiawatha Oil & Gas Co. 1 S. L. Caswell, Blk. 17, Titus CSL, TD 6,359 ft., pay 6,210 ft., IP 208½ bbl. 40°-gravity oil, 20/64-in. choke, TP 200 psi., GOR 650 cu. ft.

Stephens County: Gray Oil Co. 2 Effie Newham, 44-6-T&P, TD 1,835 ft., oil sand 1,832 ft., IP pumped 51 bbl. 41°-gravity oil.

Stonewall County: Continental Oil Co. 1 H. G. Flowers, 89-D-H&TC, TD 6,335 ft., elev. 1,755 ft., perforated Canyon sand 4,285-93 ft., IP pumped 73 bbl. 42°-gravity oil.

Taylor County: C. B. Cree 1 Coffman, Sec. 49, LAL Sur., TD 4,205 ft., elev. 1,906 ft., pay 1,468 ft., IP pumped 76 bbl. 41°-gravity oil.

Throckmorton County: D. D. Feldman 1 Mabel McKnight, Sec. 3,069, TE&L Sur., TD 5,102 ft., elev. 1,343 ft., pay 4,808 ft., IP pumped 141 bbl. 41°-gravity oil.

Rock Hill Oil Co. 1 Zula Morrison, Brooks & Burleson Sur., A-35, TD 4,580 ft., pay 4,492 ft., IP 286 bbl. 42°-gravity oil, ¼-in. choke, TP 425 psi., GOR 784 cu. ft.

Young County: Wilbert Kunkel 1 Ben Hausler, J. Donnell Sur., A-1,922, TD 1,104 ft., pay 1,008 ft., IP pumped 18 bbl. 37°-gravity oil.

Wilbert Kunkel 3 Hausler, J. Poitevent Sur., TD 1,101 ft., pay 1,097 ft., IP pumped 20½ bbl. 37°-gravity oil.

### NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Producing Co. 3 Slaughter, Blk. 15, Meades LM Pasture, dry, TD 1,429 ft.

Archer Drilling 4 Slaughter, Blk. 15, Meades LM Pasture, dry, TD 1,490 ft.

Archer Drilling 1 W. O. Wright Lease, Sec. 2,435, TE&L Sur., dry, TD 1,424 ft.

Archer Drilling 1-B Wright, Sec. 2,435 TE&L, dry, TD 1,432 ft.

Bridwell Oil Co. 1 J. Schroeder, Blk. 4, Clark & Plumb, dry, TD 3,871 ft.

R. C. Dublin 1 R. Campbell, J. H. Davidson Sur., dry, TD 1,131 ft.

THE OIL AND GAS JOURNAL

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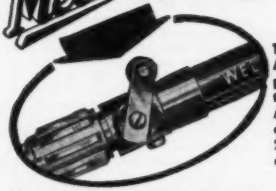

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R. Clay Underwood 1 Young & Boyett, Sec. 20, Palo Pinto CSL, dry, TD 2,007 ft.
W. T. Waggoner 2 Mrs. M. A. Garvey, Sec. 66, Harris Subd., dry, TD 1,501 ft.

Brown County: Central Texas Gas Co. 1 Frank Woods, Blk. 3, R. Hunt Sur. 63, dry, TD 2,377 ft.

Clay County: Hassie Hunt Trust 1 D. M. Cobb, Sec. 2, J. Scott Sur., dry, TD 6,141 ft.
Frank Wood 4 J. S. G. Chapin, Blk. 86, Byers Bros. Subd., dry, TD 1,216 ft.
Frank Wood 2 Ambrose Douthitt Est., Parker CSL, A-374, dry, TD 1,958 ft.
Frank Wood 2-A S. E. Lemons, Blk. 84, Byers Bros. Subd., dry, TD 1,217 ft.

Coleman County: Hal F. Rachal 1 Clyde B. Haynes, J. L. Tindell Sur. 19, dry, TD 1,030 ft.

Eastland County: C. E. Joyce 1 J. E. Watkins, Sec. 11, BBB&C Sur., dry, TD 968 ft.

Fisher County: Black & Manco 1 A. J. Ford, 18-1-HT&B, dry, TD 6,250 ft.
Texas Pacific Coal & Oil Co. 1-S O. M. Taylor "A," 182-1-BBB&C, dry, TD 3,712 ft., elev. 1,757 ft., Flippen 3,026 ft., Robinson 3,687 ft.

Jack County: Russell Maguire 1 Suttle, Wm. McElroy Sur., A-1,559, dry, TD 5,414 ft., Caddo 5,190 ft.
Star Oil Co. 1-B C. C. McClure, W. Berryhill Sur., dry, TD 5,505 ft.

Jones County: Ada Oil Co. 1 Adamson, GH&RR Sur., dry, TD 4,008 ft., elev. 1,691 ft., Flippen 2,610 ft., Canyon sand 3,805 ft.

Knox County: James R. Dougherty Est. 1 H. M. Michels, Blk. 6, D. G. Burnett Sur., dry, TD 5,572 ft.

Montague County: Benedum-Trees Oil Co. 1 T. Fenoglio, Wm. Moffett Sur., A-1,105, dry, TD 5,982 ft.

R. C. Dublin 1 J. W. Cunningham, Blk. 18, Kaufman CSL, dry, TD 3,063 ft.
D. L. Rose 1 E. W. Wright, Sec. 2, Hill CSL, dry, TD 7,029 ft.
Paul C. Teas 1 Bruce Porter, MEP&P Sur. 22, dry, TD 5,292 ft.

Nolan County: Sun Oil Co. 3 S. R. Featherstone, 37-X-T&P, dry, TD 6,882 ft.
Sun 5 B. K. Stone, 96-X-T&P, dry, TD 6,287 ft.

Palo Pinto County: Max McCotter 1 A. P. Wilbar, James Latham Sur., dry, TD 500 ft.
Thompson & Lee 1 L. E. Seaman, O. West Sur., A-1,202, dry, TD 2,507 ft.

Stonewall County: J. B. and A. W. Cherry 1 Dick Carson, Sec. 3, Seale & Morris Sur., dry, TD 6,477 ft., elev. 1,772 ft., Palo Pinto 5,349 ft., Mississippian 6,270 ft., Ellenburger 6,442 ft.
Delta Gulf Drilling Co. 1 J. W. Kennedy, Blk. 1, H&TC Sur., dry, TD 5,497 ft.
Hudson & Dearman 1 W. H. Wilson, 84-F-H&TC, dry, TD 6,391 ft., elev. 1,778 ft., Strawn 5,510 ft., Mississippian 6,190 ft., Ellenburger 6,458 ft.

Taylor County: Carl Hovgard 1 J. M. Stuart, R. Salinas Sur. 492, dry, TD 2,130 ft.

Throckmorton County: An-Son Petroleum Corp. 1 D. Condron, Sec. 218, BBB&C Sur., dry, TD 4,649 ft.
Cox Drilling Co. 1 Berry, Sec. 266, BBB&C Sur., dry, TD 4,495 ft.

Wichita County: Guy J. Brown 1 Mrs. O. F. Ashbrook, DCSL Sur., dry, TD 1,058 ft.

Wilbarger County: James B. Baker 1 Waggoner "BBB," 52-4-H&TC, dry, TD 2,040 ft.

Wise County: W. B. Ulmer 1 J. M. Hickey, E. L. Shults Sur., dry, TD 5,977 ft.

Young County: Bolin Oil Co. 1 M. Thigpen, 449-A65-TE&L, dry, TD 4,083 ft.
MOCO Oil Co. et al 1 W. F. Bailey, Sec. 166, TE&L Sur., dry, TD 915 ft.
Staley Oil Co. 1 Hannah H. Swain, 1,466-A892-TE&L, dry, TD 5,091 ft., Mississippian 5,077 ft.

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## Kansas

### Barton County Wildcat Testing Lansing Shows

ALPINE OIL & ROYALTY CO. appears to be opening another new pool in Barton County where it is testing its 1 Hammeke, a wildcat located a mile north of the Fort Zarah pool in the SE SE SW 7-19-12. The well is a prospective producer in the Lansing-Kansas City lime zone. Total depth is 3,453 ft. with top of the Arbuckle at 3,452 ft. (—1,578 ft.), and top of the Lansing-Kansas City at 3,184 ft. (—1,311 ft.). A 40-minute drill-stem test in the latter zone at 3,186-3,260 ft. filled 1,085 ft. of heavily oil and gas-cut mud with 15 ft. of water. Drilling is under way at 2-A Hammeke, SW SW SW 7, a location east of the discovery well.

Promising oil showings have been obtained by Murfin Drilling Co. at its 1 Dancer, NE NE NW 4-8-17, a wildcat located 3 miles southeast of Stockton, in the central part of Rooks County. Showings were in Lansing-Kansas City lime, topped at 3,055 ft. Recovery in a 60-minute drill-stem test at 3,143-58 ft. was 330 ft. of oil-cut mud with 30 ft. of water. At latest report, hole was being deepened to the Arbuckle. Location is a mile northeast of the Lone Star pool.

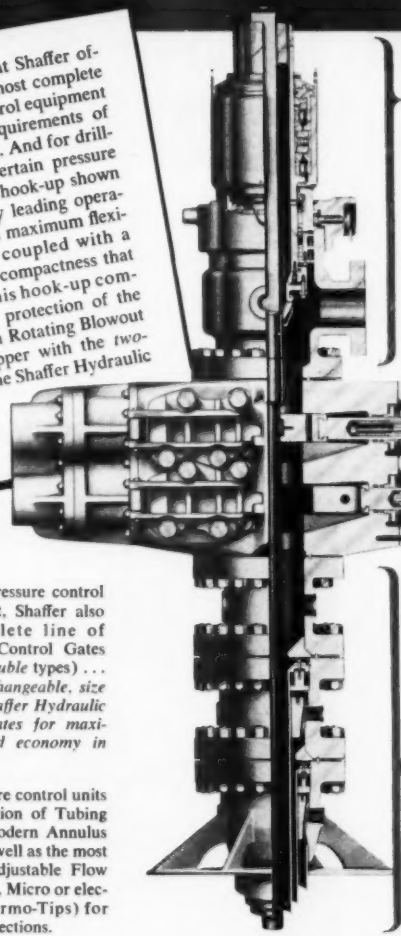
Smitherman & Cohen have completed their 1 Bergkamp, SW NW SE 6-35-4e, at the south limits of Arkansas City, Cowley County, in the extreme southern part of the state. The well, producing from Bartlesville sand, topped at 3,205 ft., pumped 74 bbl. of oil per day on potential tests. It opens the Bergkamp pool. Location is 2 miles northwest of the McKay pool, recently opened by the same operators.

**KANSAS WILDCAT SUCCESSES**

Decatur County: Continental Oil Co. 1 Hardesty, SE NE NE 22-5s-7w, 844 bbl. oil from Lansing-Kansas City at 3,843-

# 3 REASONS why this Shaffer Hook-Up is the Choice of Leading Operators!

is a recognized fact that Shaffer offers the oil industry the most complete selection of pressure control equipment to meet the varying requirements of different field conditions. And for drilling under high or uncertain pressure conditions, the Shaffer hook-up shown at right is preferred by leading operators because it permits maximum flexibility of operation, coupled with a degree of safety and compactness that are unsurpassed. This hook-up combines the *automatic* protection of the Shaffer Combination Rotating Blowout Preventer and Stripper with the *two-way* protection of the Shaffer Hydraulic Double Cellar Control Gate . . .



In addition to the pressure control units shown at right, Shaffer also provides a complete line of *Mechanical* Cellar Control Gates (both *Single* and *Double* types) . . . *and rams are interchangeable, size for size, between Shaffer Hydraulic and Mechanical Gates for maximum simplicity and economy in field operations.*

Other Shaffer pressure control units include a full selection of Tubing Heads (featuring modern Annulus Flange types) . . . as well as the most complete line of Adjustable Flow Beans (with Conical, Micro or electrically-heated Thermo-Tips) for use in the flow connections.

**1** ***THE SHAFFER COMBINATION ROTATING BLOWOUT PREVENTER AND STRIPPER*** provides—*in one unit*—every necessary feature for successful and simplified pressure control while the drill string is in the hole . . .

- **It *automatically* maintains a continuous seal around different shaped elements in the drill string — square, hexagon or round — regardless of whether the string is rotating, being raised, lowered, or is stationary.**
- **The seal *automatically* expands and contracts to fit the varying diameters of drill pipe, tool joints, couplings and drill collars.**
- **Bits, reamers and other abnormally large tools can be easily passed through the unit by merely turning the Quick Releasing Bonnet 1/6 turn and removing the sealing assembly. It's simple, quick!**

With no valves to open or close, nothing to remember, *nothing to forget* in the excitement of pressure emergencies, this unit gives *continuous* protection while the drill string is in the hole!

**2** ***THE SHAFFER HYDRAULIC DOUBLE CELLAR CONTROL GATE*** provides—*in one unit*—rams for shutting off the well when pipe is in the hole, as well as rams for sealing off open hole.

- **Rams are opened and closed by *direct* hydraulic drive in a completely enclosed unit. No complicated yokes or secondary connections, no exposed moving parts to become wedged or damaged.**
- **Even in sizes as large as 13⅝" (12" Series 900) the complete unit, including *two* ram compartments, requires only 30" cellar height—smaller sizes even less!**
- **Rams can be easily changed—whether the pipe is in or out of the hole—by simply opening two doors in the side of the gate . . . the simplest, quickest ram changes in any gate!**

There are many other vital advancements—and the same basic features are also available in the Shaffer Hydraulic *Single* Cellar Control Gate, if this design desired.

**3** ***SHAFFER LANDING AND CASING HEADS*** **are recognized throughout the industry for their rugged dependability and adaptability to various suspension and pack-off requirements. The bottom unit at left is a Shaffer Base Head from which two strings of casing are suspended and packed-off with maximum compactness . . . and in the Head above it a third string is suspended and packed off.**

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3,712 ft., TD 4,095 ft. PBTD 3,713 ft (Adell, NW).

Ellis County: Imperial Petroleum Co., Inc., 1 Vance, SW SW NW 19-11s-29w, pumped 316 bbl. oil from Lansing-Kansas City at 3,708-20 ft., TD 3,844 ft. PBTD 3,730 ft. (Nicholson, N.).

Pratt County: Lion Oil Co. 1 Eubanks, NE NE NE 8-27s-14w, 8,388 M.c.f. gas from Lansing-Kansas City at 3,929-36 ft., TD 4,646 ft. PBTD 3,943 ft.

**KANSAS WILDCAT FAILURES**

Barton County: Stanolind Oil & Gas Co. 1 L. Stos, NW NE NE 18-17s-15w, dry, TD 3,775 ft.

Butler County: Rex & Morris Drilling Co. 1 Poffinbarger, NE SE SE 14-24s-2e, dry, TD 2,490 ft.

Phillips County: Rine Drilling Co. 1 Frazer, NW NW SE 8-1s-17w, dry, TD 3,893 ft.

Rush County: Flynn Oil Co. 1 Tammea, NE NE NE 8-19s-16w, dry, TD 3,895 ft.

Russell County: Barnett 1 Speere, SE SE NE 23-13s-14w, dry, TD 3,300 ft.

Sedgwick County: E. F. Wakefield 1 Long, SW NE SW 1-29s-1e, dry, TD 3,875 ft.

Wallace County: F. W. Wyatt 1 Pearce, NW NW SW 4-14s-38w, dry, TD 5,060 ft.

# Appalachian-Ohio

## Good Gas Well Reported in Mingo County, West Virginia

PITTSBURGH.—Circleville district, Pendleton County, West Virginia, Seneca Gas & Oil Co., located 1-2 Waitman Bennett, rank wildcat, elevation 2,635 ft., Spruce Knob quadrangle, 5.05 miles south of latitude 38° 40′ and 1.3 miles west of longitude 79° 30′. Portland district, Preston County, Cumberland & Allegheny Gas Co., has announced 4-480 Cora E. Lewis, elevation 2,239 ft. Hope Natural Gas Co. 9676 Sarah J. Creamer, elevation 2,097 ft., topped the chert at 5,060 ft. and drilling is at 5,061 ft. Harvey district, Mingo County, United Fuel Gas Co. 6834 Henry Closterman, resulted in 1,205,000 cu. ft. gas, Big lime, total depth 1,843 ft.

**Garrett County, Maryland.**—Mid Atlantic Oil and Gas Co. 1 Joe Collins, elevation 2,461 ft., resulted in 150,000 cu. ft. gas, Onondaga 3,878 ft., chert 3,912 ft., total depth 3,970 ft. Eberly & Snee 3 Eli Beechie, elevation 2,447 ft., reached the Onondaga at 4,011 ft., and shut down at 4,030 ft. Fox & Trimble 2 McGee, elevation 2,407 ft., remains shut down at 3,889 ft. The Onondaga was at 3,823 ft., chert 3,857 ft., show gas 3,872 ft. Roy Fletcher 1 A. W. Killius reached a depth of 4,080 ft., with the chert at 3,850 ft., gas 3,879-3,884 ft., Oriskany 3,967 ft., gas 4,026-32 ft. All gas tested 230,000 cu. ft., after shot.

**Unity Township, Westmoreland County.**—Southwest Pennsylvania, Peoples Natural Gas Co. 4003 A. J. Dotterway, elevation 2,094 ft., is drilling at 5,350 ft. South Buffalo Township, Armstrong County, Pittsburgh Plate Glass Co. 2-839 Mary A. McGinley, elevation 1,153 ft., is shut down at 7,001 ft.

**MARYLAND WILDCAT SUCCESS**

Garrett County: Mid Atlantic Oil & Gas Co. 1 Joe Collins, elev. 2,461 ft., 150,000 cu. ft. gas, Onondaga 3,878 ft., chert 3,912 ft., TD 3,970 ft.

**OHIO**

An addition to the Sandyville field was completed by W. P. Hambleton et al on 1 Bertha Steinback, Lot 14, Dover Township, Tuscarawas County. Gas from white Clinton at 4,769-89 ft. gaged 1,630,000 cu. ft. natural with 1,100 lb. pressure.

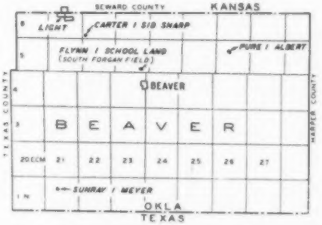
Mutual Oil & Gas Co. 1 Lowell Snider, third quarter quadrangle, New Castle Township, Coshocton County, showed 28 bbl. natural in the second Clinton at 3,299-3,313 ft. After shooting with 70 qt. the oil increased to 55 bbl. in 19 hours. In the extreme north end of the same township, John Morrow et al have moved ¾ mile northeast of their 6 Rodehaver for a test on Ernestine Leonhardt, Lot 11.

B. H. Putnam et al 1 John Walker, Belpre Township, Washington County, was reshot with 2,033 lb. and in 32 hours blew down to 190,000 cu. ft.

# Oklahoma

## Testing Under Way at Beaver County Wildcat

TESTING is under way at Carter Oil Co.'s and Emby Kaye's prospective oil discovery well, 1 Sid Sharp, C SE SE 31-6n-22eCM, 2 miles northwest of Floris, in northwestern Beaver County, Oklahoma Panhandle. Casing, which was run through




well's indicated upper Cherokee lime pay zone to bottom of the hole at 5,867 ft., has been perforated initially at 5,833-49 ft., exposing the top part of the zone. A preliminary drill-stem test of this interval failed to produce, getting only a puff of air. Operators will acidize the interval before reattempting the test.

A drill-stem test of the formation before casing was run resulted in a recovery of 1,850 ft. of clean, green oil and 150 ft. of oil and gas-cut mud. That test was made at the bottom of the hole, taking in the interval below 5,837 ft.

Location of the well, 3 to 4 miles southeast of the Light Ranch gas field, is about 12 miles northwest of Flynn Oil Co.'s recently completed Marmaton lime oil-discovery well north of Beaver, the county seat, and now designated as the South Forgan pool. Two additional wells are drilling in that area.

Pure Oil Co.'s prospective gas-distillate discovery well, 1 Albert, SE SE SW 16-5n-26eCM, 3 miles northwest of Knowles, in the northeastern part of the county, is standing, with rotary rig moved out, after tests of various horizons, latest being in Morrow sand at 6,018-27 ft. Hole is plugged back to 6,068 ft. from its original total depth of 9,233 ft. in the Arbuckle. Sunray Oil Corp.'s rank wildcat test, 1 Meyer, C NW SW 16-1n-21eCM, 2½ miles northeast of Gray, in the southwest part of the county, was drilling near 6,100 ft. at latest report.

Phillips Petroleum Co. has encountered promising oil showings in Springer sand at its 1 Denson, SW SW SW 18-3n-3w, deep wildcat test in western Garvin County. Top of the sand was logged at 9,498 ft. A 60-minute drill-stem test at 9,501-21 ft. got gas in 55 minutes and recovered 20 ft. of clean oil and 90 ft. of oil-cut mud. The well previously had found good indications of production in Hart (Deese) sand, topped at 8,592 ft. Best showings were in an interval at 8,620-45 ft., where a 60-minute drill-stem test filled 2,883 ft. of 40°-gravity oil at the calculated rate of 41 bbl. per hour.

Location of the well is about 3 miles west of development along the Golden Trend. It is about 3½ miles north of a Springer sand discovery well completed late in 1951 by Vickers Petroleum Co. The latter well opened the Southwest Purdy pool and the first, and so far only Springer production in Garvin County, located on the east rim of the Anadarko basin.

Cities Service Oil Co. has uncovered a new and deeper pay zone, the Bromide sand, for the East Bradley field, McClain County, at its 1-D Jones, C NE SE 30-5n-4w. A drill-stem test in the first Bromide sand at 11,220-11,305 ft. flowed 43°-gravity oil at an estimated rate of 35 bbl. per hour with gas at an estimated rate of 1,500,000 cu. ft. per day. In a drill-stem test at 11,305-79 ft., in second Bromide, gas was at the top in 45 minutes, and oil flowed at an estimated rate of 60 bbl. per hour. Recovery in the breakdown was 3,200 ft. of oil and 130 ft. of oil and gas-cut mud. Previous production in the field has been from the Chimney Hill (Hunton) zone at 10,250 ft.

**OKLAHOMA WILDCAT SUCCESS**

Murray County: Anderson-Prichard Oil Corp. 1 Letah Myers, NW SE SE 2-1s-2e, pumped 12 bbl. 27°-gravity oil from Hunton-Viola at 2,012-72 ft., 2,280-90 ft., 2,510-50 ft., TD 4,330 ft.

**OKLAHOMA WILDCAT FAILURES**

Jefferson County: Champlin Refining Co. et al 1 Baucum, NE SE SE 35-4s-5w, dry, TD 6,557 ft.

Goff and Leeper Drilling Co. 1 Wirt Franklin, NE NE NW 22-4s-6w, dry, TD 4,703 ft.

Kiowa County: A. A. Potter 1 School Land, NW NE NW SE 36-7n-18w, dry, TD 1,318 ft.

Logan County: Davidor & Davidor 1 Downey, SE SW NW 9-16n-1e, dry, TD 5,494 ft.

Mid-Continent Petroleum Corp. 1 Acton, SE SE SW 36-19n-4w, dry, TD 4,896 ft.

Noble County: Skiles Oil Corp. 1 Eagers, NW SW NW 30-21n-3e, dry, TD 4,247 ft.

D&L Oil Co. 1 Garrett, NW NW SE 6-22n-1e, dry, TD 4,601 ft.

Pawnee County: Harper-Turner Oil Co. 1 De Witt, SW SW NW 26-20n-5e, dry, TD 3,851 ft.

Payne County: Ryan Oil Co. 1 Berry, SE SE NE 32-18n-1e, dry, TD 5,383 ft.

Pottawatomie County: James S. Wise et al 1 Clemence, SE SW NW 22-11n-5e, dry, TD 4,780 ft.

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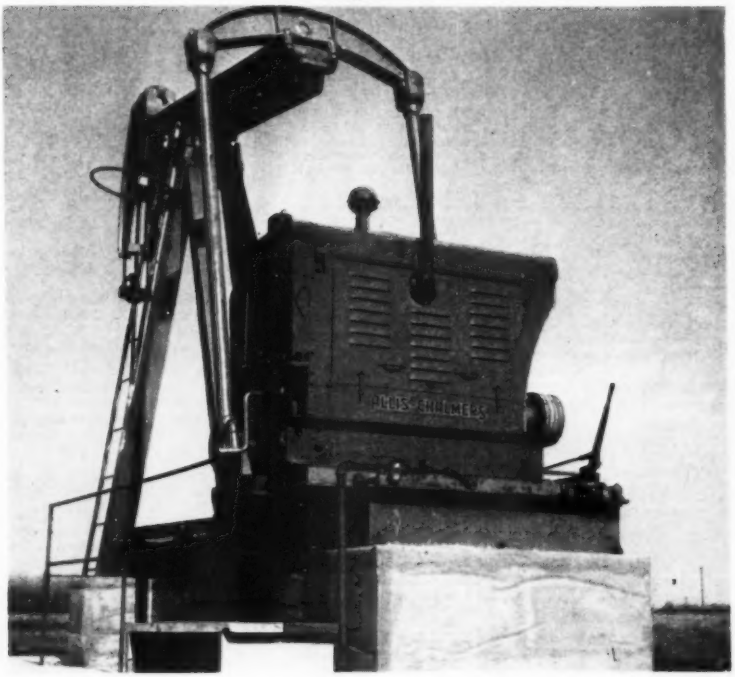

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Allis-Chalmers Engines deliver a *smooth flow* of power, at *moderate* speeds protecting your pumping unit and rods from shock and fatigue.

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Houston, Odessa, Los Angeles

# Central Area

### ILLINOIS

A three-quarter-mile westward extension of production of the Phillipstown Consolidated field is indicated in the area 1½ miles south of Crossville where E. J. Cunningham is testing a prospective Rosiclare lime pay zone at his 1 Susie Ackerman, SE SW SE 26-4s-10e. The indicated pay is open through casing perforations at 3,020-28 ft. Swabbing is under way although as this is written no estimate of productivity has been made. A 60-minute drill-stem test prior to running casing got a flow of clean oil and yielded 2,930 ft. of oil and gas in the breakdown. Total depth is 3,115 ft.

Jet Oil Corp. has what appears to be an unusually good well in the recently opened Tilden pool, northeastern Randolph County. The well, 5 Easdale, NW SW NE 16-4s-5w, is reported to have flowed initially at the rate of more than 50 bbl. per hour while testing the pool's Silurian lime pay zone at a total depth of 2,200 ft. The new producer, the fourth for the pool, is one location diagonally southeast of the discovery well. One dry hole has been drilled.

### INDIANA

T & H Corp. has completed a good producer in the Terre Haute East pool, 2 miles southeast of Terre Haute, Vigo County. Its 1 Clara Whitlock, NW NE SE 36-12n-9w, pumped and flowed at the rate of 600 bbl. per day from broken Devonian at 1,658-76 ft. Top of the pay is 1,651 ft. and bottom of the hole 1,681 ft. The pool, opened last May, now has 8 producers.

### WESTERN KENTUCKY

Max J. Lewis and John Tuttle have an indicated Cypress producer at their 1 Liles, 3 miles west of Poole, Webster County. Location, in 9-N-22, is west of production of the Poole West pool. Cypress sand, logged at 2,274-80 ft., is a new pay zone for the immediate area, where production is mainly from Tar Springs sand. Following a 60-minute drill-stem test of that interval, there was 1,600 ft. of gas, 340 ft. of clean oil and 5 ft. of mud-cut oil in the pipe. No water was indicated. Bottom-hole pressure was 520 psi.

### EASTERN KENTUCKY

In the Pilot East pool along the Wolfe and Powell County line, Albert Dodge, Agent, has completed 36 J. B. White heirs located on White's Branch for 5 bbl. of oil daily from the Corniferous lime topped at 1,014 ft. and bottomed at 1,025 ft.

In northern Letcher County, the wildcat test of Kentucky West Virginia Gas Co. is drilling at 1,774 ft. in a Pennsylvanian sand. Well is on the W. R. Polly tract.

On the Sand Hook anticline in north central Elliott County, Herchenroeder et al are drilling at 230 ft. at their wildcat on the Ison & Green farm. Test is located ½ mile east of a wildcat failure which had a show of oil when originally drilled.

### MICHIGAN

A good Stray sand gas pay was being tested this week in the Mineral Springs Dundee oil pool at Walter E. Anderson 1 Kidder, SW SE NE 20-20n-9w, Sherman Township, Osceola County. This is the first test in the pool not to be drilled all the way to the Dundee objective with rotary tools and because of this, the gas showed for first important consideration. The 1 Kidder is the direct east 40-acre offset to the Dundee discovery well in the pool.

Although good information was being held somewhat confidential, it appeared that some reliable data was available. Michigan Stray sand was logged at 1,385 ft. First gas showed at 1,387-88 ft., and was gaged at 1,605,000 cu. ft. a day at this point. Next increase was logged at 1,389-90 ft. and gage showed 2,400,000 cu. ft. at this point. At 1,391 ft. well gaged 6,240,000 cu. ft. of gas. Further deepening and testing of this section was in progress, but operator indicated that well probably would be carried on to the Dundee oil objective.

After this good gas pay showed at the Anderson 1 Kidder, Mogul Oil Co. discoverer and largest developer and acreage owner in the Mineral Springs pool started studying Schlumberger electric log surveys of its 10 completed rotary holes in the area. (Five of these completions were failures.) A study of the Stray section on these logs appeared to offer prospect of possible gas pays in several of these wells, and Mogul announced that it would rework one or more of the failures in the Stray sand at an early date.

The narrow, but long and prolific Pinconning Dundee oil pool, Bay County, was extended another 1,685 ft. due northeast this week as Ogma Development Co. 1 Zuziak, NE SW SW 25-17n-4e, Pinconning Township, was completed good for an estimated 65 bbl. of oil an hour natural in the top of the Dundee at 2,805 ft., total depth. Dundee top was logged at 2,802 ft. and pay section was 2,803-05 ft. Several other tests were either ready to be spudded or were projected for the area following this well, and hopes were again raised for the possible development of an important Dundee oil reserve in the area.

### ILLINOIS WILDCAT FAILURES

Edgar County: Carl Wright 1 York, SW NW NW 12-13n-14w, junked hole, TD 110 ft.

Lawrence County: Big Four Oil & Gas Co. and Hays Drilling Co. 1 Fearheily, SE SE NW 27-4n-13w, dry, TD 2,663 ft.

Richland County: D. E. Smith 1 Ridgley, SE SW SE 28-2n-14w, dry, TD 3,143 ft.

White County: C. E. O'Neal 1 Schneider, NW NW NE 19-5s-10e, dry, TD 3,263 ft.

### INDIANA WILDCAT FAILURES

Knox County: Ashland Oil & Refining Co. and C. E. O'Neal 1 Held, SW SW NE 20-2n-10w, dry, TD 1,922 ft.


MERCOID

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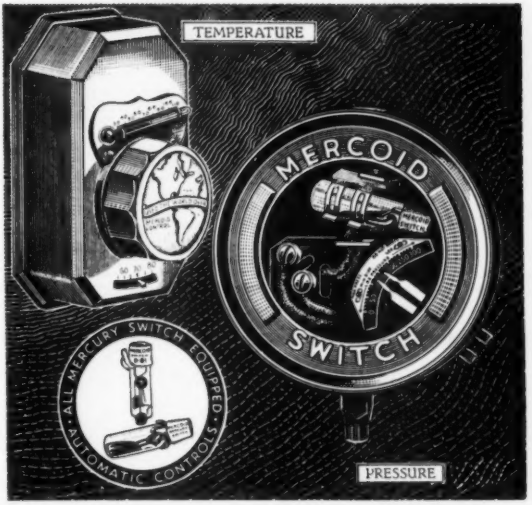


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THE MERCOID CORPORATION
4201 BELMONT AVE. CHICAGO 41, ILL.

National Associated Petroleum Co. 1 McCormick, S½ SW NW NW 34-2n-9w, dry, TD 1,660 ft.

Posey County: Inland Producers, Inc., 1 Bass, SE NW SE 17-7s-12w, dry, TD 2,802 ft.

Sullivan County: Kuhn & Banks 1 Eaton, NE NW SW 1-7n-9w, dry, TD 425 ft.
Kuhn & Banks 2 Eaton, NE NW SE 1-7n-9w, dry, TD 1,491 ft.

Vigo County: George Nesbitt 1 Joseph, NW NW NE 32-12n-8w, dry, TD 900 ft.

**WESTERN KENTUCKY WILDCAT FAILURES**

Daviess County: S. McIntosh 1 Cook, W½ NE NE NW 23-O-31, dry, TD 1,418 ft.
J. C. Miller and Ashland Oil & Refining Co. 1 Foster, SE SE SW NW 3-P-27, dry, TD 1,970 ft.

Henderson County: V. R. Gallagher 1 Tapp, W½ NW NW SE 2-N-24, dry, TD 2,550 ft.

**MICHIGAN WILDCAT FAILURES**

Allegan County, Clyde Township: P. K. Degenther 2 U.S.A., SE NE NW 25-2n-15w, Traverse 1,317 ft., dry, TD 1,350 ft.
Gun Plains Township: H. E. Walton 1 Doster, SE SW SE 14-1n-11w, Traverse 1,636 ft., dry, TD 1,647 ft.

Kent County, Tyrone Township: Merrill Drilling Co. and Wm. B. Darke 1 Harrison, SW SW SW 4-10n-12w, Traverse 2,400 ft., dry, TD 2,415 ft.

Montcalm County, Bloomer Township: Columbia Oil & Gas Co. 1 Hafer, NW NW NE 8-9n-5w, Dundee 3,118 ft., dry, TD 3,175 ft.

Newaygo County, Brooks Township: John F. Melvin 1 Calvert, SE SW SW 10-12n-12w, Traverse 2,447 ft., dry, TD 2,474 ft.

Ottawa County, Zeeland Township: P. K. Degenther 1 Koomen, NE SW NE 8-5n-14w, Traverse 1,706 ft., dry, TD 1,712 ft.
Smith Petroleum Co. 1 Koert, SW SW NE 34-5n-14w, Traverse 1,529 ft., dry, TD 1,532 ft.

## LeBus International Amounces New Appointments

*K. C. SLOUGH*

Frank L. LeBus, Sr., president of LeBus International Engineers, Ltd., recently announced the following appointments:

Kenneth C. Slough has been appointed as sales representative for the Permian basin area, and Lonnie D. Thompson has been promoted to installation and service engineer in the same area.

Slough was previously associated with LeBus in the capacity of sales representative for LeBus Rotary Tool Works. In his new position he will be working on sales and promotion of LeBus grooving and wire-line spooling systems, with headquarters in Odessa, Tex.

Since the formation of LeBus International, Thompson has been working as installation engineer and has made installations of LeBus grooving and wire-line spooling systems on almost every type rig used in the oil fields.

The company also announces the appointment of M-C-M Machine Works as sales and service representatives for LeBus grooving and wire-line spooling service in the Oklahoma area.

C. O. Moorhead, general manager for M-C-M, will handle all wire-line grooving sales. He has been closely associated with LeBus during the past 4 years handling sales in the Oklahoma area for LeBus Rotary Tool Works.

The installation and service of LeBus grooving and wire-line spooling systems will be supervised by H. C. Garlick, field engineer of M-C-M.

## South Chester Tube Co. Increases Sales Personnel

South Chester Tube Co. has increased its sales forces in the Southwest and Mid-Continent districts.

Thomas L. Vance has been assigned to the company's office at Fort Worth. Ivan M. Fischer has become associated with the company at Houston, and Robert E. Wallace, Jr., has been transferred from the eastern district to the Mid-Continent district with headquarters in Hutchinson, Kans.

These men will devote special attention to sales promotion of South Chester's specialty products such as asbestos-cement pipe, plastic pipe, and glass pipe wrap. They will also handle the company's regular line of steel pipe.

**Reduce Your Cost**
for
pump repairs and well pulling
due to pump trouble

**SAVE** UP TO 80%
UP TO $2500.00
per year on a SINGLE well

And it may not cost you a cent . . . for in many cases the MARTIN PLUNGER costs no more than the replacement of your present plunger. MARTIN CAGES, with their long life, synthetic rubber ball guides, protect balls and seats and increase savings. Ask almost anyone around Freer or Smackover, or Oklahoma City, or wherever hard pumping conditions are found.

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Tom Hulett, Tel. 3-4545, El Dorado, Ark.
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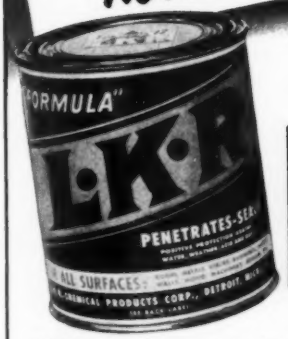


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*L.K.R. protects, adds life to all type roofs, new or old, on commercial, industrial structures, homes, and cooling towers, roof vents, etc.

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Write for descriptive literature for use on roofs, metals, stacks, tanks, machinery, bridges and walls both wood and masonry.

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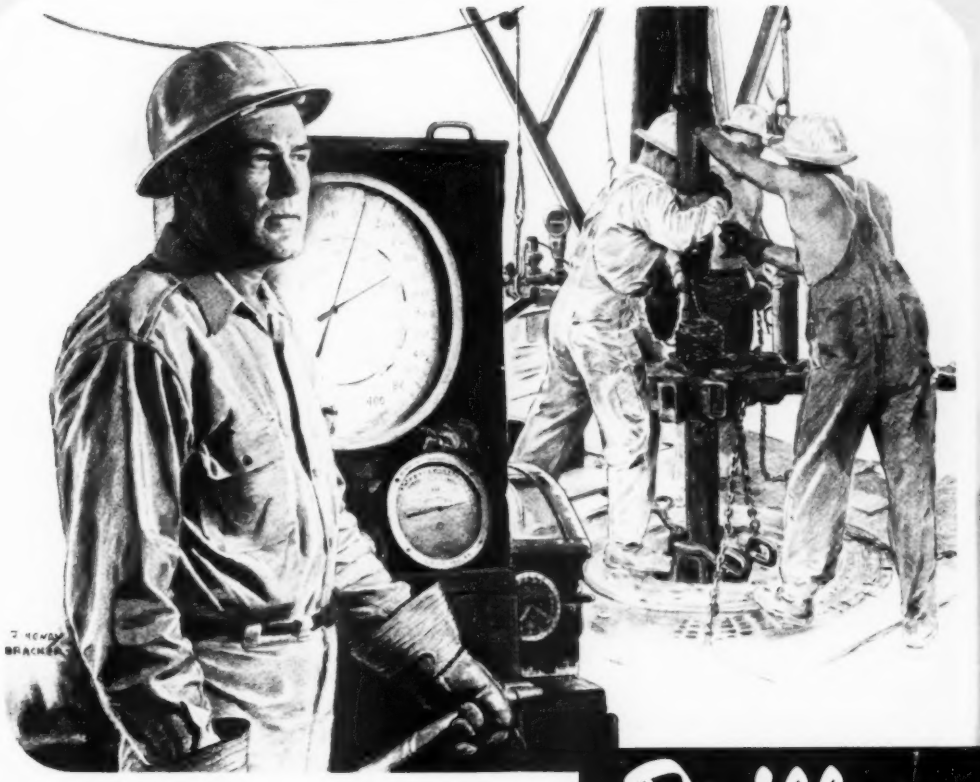
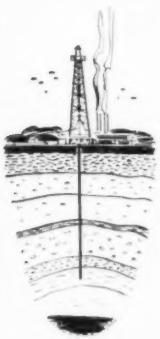


# The Drilling Contractor's Driller



In the past ten years, the average speed of making hole has been increased about 35% — a remarkable achievement! Improved equipment has had much to do with this... but much of the credit must also go to the man who *operates* the equipment.

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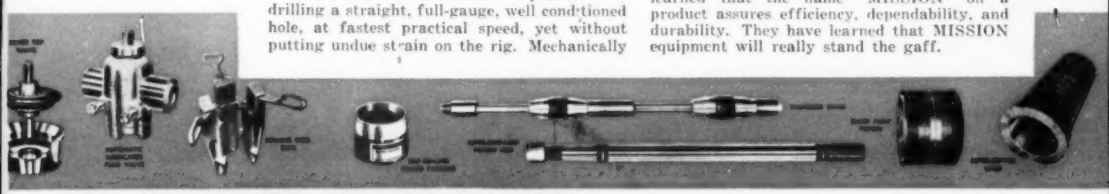
Carrying out general directions from the Tool Pusher, the Driller is responsible for drilling a straight, full-gauge, well conditioned hole, at fastest practical speed, yet without putting undue strain on the rig. Mechanically minded to start with, the Driller has come to possess a sixth sense which enables him to judge by the behavior of the drill stem and the feel of the brake lever, just what is happening a mile or two miles down, at the bottom of the hole. He is responsible for maintaining correct speed of rotation, weight on the bit, pump pressure, and makes such important decisions as when bit should be changed, etc. The efficiency of the rig and crew are his responsibility.

With his fingers on the pulse of his rig 8 hours a day, no one has a greater appreciation of fine equipment than does the Driller. It is therefore significant that the Drillers of the nation and of the world have only highest praise for MISSION equipment. Through 25 years of actual experience, Drillers have learned that the name "MISSION" on a product assures efficiency, dependability, and durability. They have learned that MISSION equipment will really stand the gaff.



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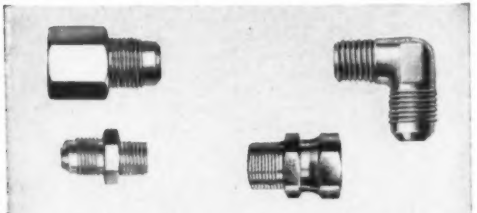

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*Federated Metals Division*

**AMERICAN SMELTING AND REFINING COMPANY**

**120 Broadway, New York 5, N. Y.**

# January Well Completions Total 4,074, Highest Number Since Last August

THE new year is off to a good start. During January operators drilled 4,074 wells, a gain of 340 over December 1951. This is the highest number of well completions reported since August 1951. January completions showed a 20 per cent gain over the same period of 1951.

Oil successes were up 204 over December and up 234 over the corresponding 1951 period. There were 10 more gas wells in January than in December, 67 more than in January last year. Operators punched 1,635 dry holes, 126 more than in December. Dry-hole completions were ahead of January 1951 by 401. Drillers went below 12,500 ft. in 25 holes, 16 more than last January. Footage drilled increased 11 per cent over December.

**January '52 vs. December '51**

**West Coast.**—California reported a decrease of 34 well completions. Heavy rains and flooding conditions caused suspension of drilling at many wildcat and field wells. The fourth new pay zone was opened in Castaic Junction field.

**North Central.**—Completions in the Ohio-Kentucky-Illinois-Indiana-Michigan area were up by 32 wells. Footage in the area was up 54,041 ft., or 5 per cent.

**Rocky Mountain.**—The area including Colorado, Montana, Wyoming, Utah, and the Dakotas reported a decrease of 49 well completions, or 33 per cent. This is an increase of only 12 over January 1951.

**Mid-Continent.**—This section, including Kansas, Nebraska, and Oklahoma, showed an increase of 130 completions, or 14 per cent. Footage drilled increased 511,914 ft., or 15 per cent. Following discovery of Flynn Oil Co.'s rank wildcat in Beaver County, Oklahoma, new emphasis has been put on Panhandle drilling.

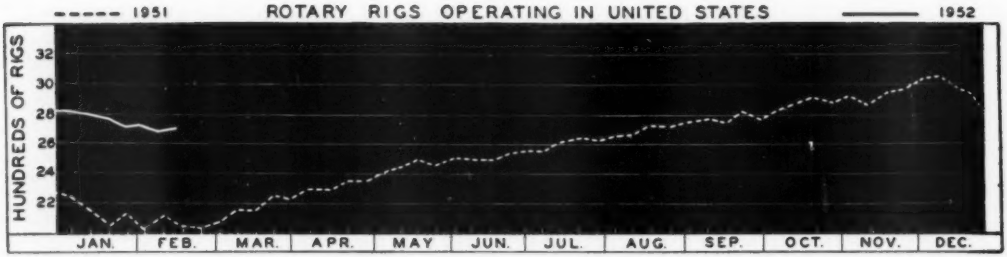
**Southwestern.**—Texas and New Mexico together gained 274 completions, or 18 per cent. Footage drilled increased 1,436,760 ft., or 19 per cent. Texas reported 10 wells drilled to depth of over 12,500 ft.

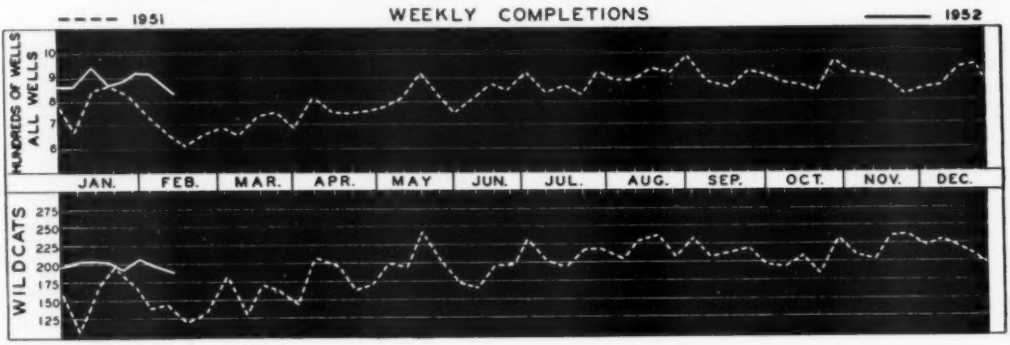
**Southern.**—Arkansas, Mississippi, Louisiana, and Alabama reported an increase of 10 well completions. January drilling resulted in discovery of two new oil fields in North Louisiana. The new fields are Helena in Tensas Parish, and Rockpoint in Caddo Parish. The fourth commercial oil-field discovery well in Alabama was completed, being named Pollard.

## SUMMARY OF COMPLETIONS, JANUARY 1952

| | Total comp. | Oil | Gas | Dry | Under 2,500 ft. | 2,500-5,000 ft. | 5,000-7,500 ft. | 7,500-10,000 ft. | 10,000-12,500 ft. | Over 12,500 ft. | Total footage | Rigs and drilling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New York | 29 | 16 | 0 | 13 | 29 | 0 | 0 | 0 | 0 | 0 | 42,400 | 45 |
| Pennsylvania | 121 | 53 | 23 | 45 | 114 | 2 | 5 | 0 | 0 | 0 | 177,720 | 175 |
| West Virginia | 48 | 7 | 34 | 7 | 23 | 23 | 2 | 0 | 0 | 0 | 131,031 | 195 |
| Maryland | 5 | 0 | 4 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 20,116 | 27 |
| Ohio | 86 | 34 | 16 | 36 | 44 | 42 | 0 | 0 | 0 | 0 | 187,580 | 143 |
| Kentucky | 115 | 45 | 20 | 50 | 76 | 39 | 0 | 0 | 0 | 0 | 227,439 | 75 |
| Illinois | 146 | 64 | 1 | 81 | 55 | 91 | 0 | 0 | 0 | 0 | 365,603 | 225 |
| Indiana | 110 | 35 | 6 | 69 | 97 | 13 | 0 | 0 | 0 | 0 | 191,697 | 164 |
| Michigan | 42 | 17 | 0 | 25 | 17 | 25 | 0 | 0 | 0 | 0 | 121,307 | 129 |
| Kansas | 463 | 221 | 21 | 221 | 38 | 416 | 7 | 2 | 0 | 0 | 1,603,343 | 421 |
| Nebraska | 21 | 5 | 0 | 16 | 3 | 9 | 8 | 1 | 0 | 0 | 98,450 | 23 |
| Oklahoma | 546 | 273 | 37 | 236 | 170 | 249 | 99 | 17 | 11 | 0 | 2,026,041 | 916 |
| Texas | 1,667 | 975 | 69 | 623 | 349 | 543 | 504 | 213 | 48 | 10 | 8,308,760 | 1,548 |
| North | 278 | 143 | 3 | 132 | 108 | 113 | 57 | 0 | 0 | 0 | 951,964 | 164 |
| West Central | 225 | 84 | 2 | 139 | 79 | 118 | 28 | 0 | 0 | 0 | 730,994 | 181 |
| West | 507 | 416 | 2 | 89 | 59 | 113 | 252 | 59 | 16 | 8 | 2,975,417 | 629 |
| Panhandle | 62 | 26 | 22 | 14 | 13 | 40 | 6 | 3 | 0 | 0 | 219,966 | 111 |
| Eastern | 79 | 48 | 3 | 28 | 3 | 26 | 25 | 21 | 4 | 0 | 481,840 | 79 |
| Gulf Coast | 289 | 147 | 24 | 118 | 19 | 74 | 72 | 97 | 25 | 2 | 1,894,831 | 225 |
| Southwest | 227 | 111 | 13 | 103 | 68 | 59 | 64 | 33 | 3 | 0 | 1,053,748 | 159 |
| Louisiana | 223 | 112 | 28 | 83 | 46 | 41 | 48 | 30 | 51 | 13 | 1,525,528 | 277 |
| Northern | 118 | 51 | 23 | 44 | 37 | 41 | 33 | 7 | 0 | 0 | 462,455 | 103 |
| Southern | 105 | 61 | 5 | 39 | 3 | 0 | 15 | 23 | 51 | 13 | 1,063,073 | 174 |
| Arkansas | 33 | 19 | 0 | 14 | 5 | 23 | 3 | 2 | 0 | 0 | 122,159 | 39 |
| Mississippi | 43 | 19 | 2 | 22 | 0 | 2 | 30 | 7 | 4 | 0 | 302,344 | 42 |
| Ala., Ga., Fla. | 5 | 2 | 0 | 3 | 1 | 1 | 2 | 1 | 0 | 0 | 25,753 | 7 |
| Montana | 9 | 4 | 2 | 3 | 4 | 1 | 2 | 2 | 0 | 0 | 39,567 | 53 |
| Wyoming | 45 | 27 | 2 | 16 | 3 | 13 | 23 | 4 | 2 | 0 | 261,510 | 153 |
| Colorado | 40 | 22 | 0 | 18 | 0 | 6 | 31 | 2 | 1 | 0 | 221,880 | 53 |
| Utah | 3 | 2 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 15,917 | 42 |
| New Mexico | 78 | 44 | 21 | 13 | 16 | 32 | 8 | 10 | 12 | 0 | 400,430 | 237 |
| California | 195 | 155 | 2 | 38 | 63 | 83 | 28 | 7 | 12 | 2 | 799,078 | 277 |
| Miscellaneous | §1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 3,250 | ¶20 |
| Total January 1952 | 4,074 | †2,151 | 288 | *1,635 | 1,147 | 1,661 | 802 | 298 | 141 | 25 | 17,218,903 | 15,286 |
| Total December 1951 | 3,734 | 1,947 | 278 | 1,509 | 1,100 | 1,516 | 727 | 262 | 96 | 33 | 15,472,266 | 5,851 |
| Total January 1951 | 3,372 | 1,917 | 221 | 1,234 | 1,049 | 1,458 | 574 | 208 | 74 | 9 | 13,172,011 | 4,636 |
| Alberta, Canada: January 1952 | 102 | 63 | 7 | 32 | 18 | 27 | 56 | 1 | 0 | 0 | 452,190 | |

*Incl. 78 service wells: N. Y. 13, Pa. 40, Ohio, 8, Kans. 2, Okla. 10, N. Tex. 3, W. Cent. Tex. 1, Miss. 1. †Incl. 50 condensate wells: Okla. 1, W. Tex. 5, E. Tex. 8, Tex. Gulf Coast 16, SW. Tex. 8, S. La. 12. ‡Incl. all wells rigged up and/or drilling at month end. §Incl. 1 S. Dakota at 3,250 ft. ¶Incl. S. D. 3, N. D. 14, Idaho, Nev., Arizona 3.



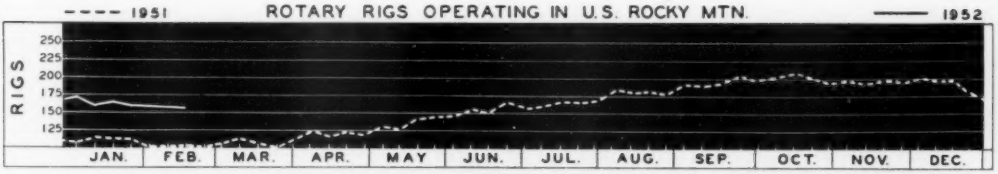

# CURRENT STATISTICS

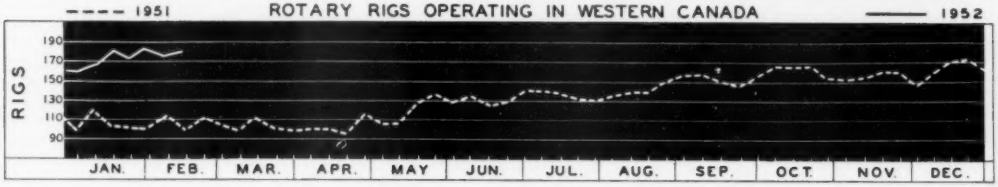
## EXPLORATION

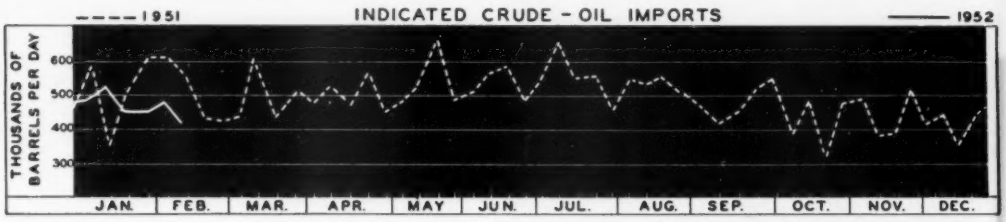
### WEEKLY WELL COMPLETIONS . . . WEEK ENDED FEBRUARY 16, 1952

| | Total of all wells | | | | | Feb. 16 | | Wildcat completions and discoveries | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Cumulative total, 1952 | | | | | |
| | Comp. | Oil | Gas | Dry | Footage | 1952 | 1951 | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| New York | 12 | 6 | 0 | *6 | 17,700 | 51 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pennsylvania | 30 | 12 | 4 | †14 | 54,460 | 197 | 98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Virginia | 19 | 4 | 14 | 1 | 55,539 | 99 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Ohio | 18 | 4 | 5 | ‡9 | 47,310 | 113 | 108 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Indiana | 11 | 3 | 0 | 8 | 19,089 | 137 | 122 | 0 | 0 | 0 | 6 | 6 | 6 | 0 | 2 | 49 | 57 |
| Kentucky | 18 | 4 | 7 | 7 | 42,625 | 158 | 107 | 0 | 0 | 0 | 3 | 3 | 4 | 0 | 0 | 26 | 30 |
| Illinois | 19 | 7 | 0 | 12 | 50,583 | 194 | 266 | 0 | 0 | 0 | 4 | 4 | 1 | 0 | 0 | 44 | 45 |
| Michigan | 13 | 3 | 0 | 10 | 34,959 | 75 | 80 | 0 | 0 | 0 | 7 | 7 | 5 | 0 | 0 | 29 | 34 |
| Kansas | 66 | 35 | 4 | 27 | 226,194 | 684 | 524 | 2 | 0 | 1 | 7 | 10 | 14 | 0 | 3 | 121 | 138 |
| Nebraska | 8 | 1 | 0 | 7 | 38,475 | 40 | 40 | 1 | 0 | 0 | 7 | 8 | 2 | 0 | 0 | 26 | 28 |
| Oklahoma | 115 | 56 | 4 | 55 | 436,399 | 876 | 730 | 1 | 0 | 0 | 11 | 12 | 8 | 1 | 3 | 90 | 102 |
| Texas | 363 | 226 | 8 | 129 | 1,845,883 | 2,301 | 2,050 | 19 | 0 | 1 | 83 | 103 | 95 | 9 | 14 | 543 | 661 |
| North Central (District 7-B & 9) | 115 | 51 | 0 | §64 | 402,324 | 704 | 609 | 13 | 0 | 0 | 43 | 56 | 60 | 0 | 3 | 250 | 313 |
| West (Dist. 7-C & 8) | 117 | 103 | 0 | 14 | 707,348 | 730 | 620 | 3 | 0 | 0 | 11 | 14 | 17 | 0 | 0 | 79 | 96 |
| Panhandle (Dist. 10) | 10 | 4 | 2 | §4 | 33,067 | 82 | 96 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 1 | 12 | 14 |
| Eastern (Dist. 5 & 6) | 16 | 7 | 0 | 9 | 93,357 | 111 | 144 | 1 | 0 | 0 | 5 | 6 | 3 | 1 | 0 | 28 | 32 |
| Gulf Coast (Dist. 2 & 3) | 56 | 35 | 4 | 17 | 362,172 | 366 | 305 | 2 | 0 | 0 | 11 | 13 | 6 | 5 | 4 | 86 | 101 |
| Southwest (Dist. 1 & 4) | 49 | 26 | 2 | 21 | 247,615 | 308 | 276 | 0 | 0 | 1 | 11 | 12 | 8 | 3 | 6 | 88 | 105 |
| Louisiana | 41 | 17 | 5 | 19 | 296,710 | 314 | 270 | 1 | 0 | 0 | 5 | 6 | 5 | 3 | 0 | 35 | 43 |
| Northern | 21 | 7 | 5 | 9 | 85,789 | 177 | 127 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 17 | 19 |
| Southern | 20 | 10 | 0 | 10 | 210,921 | 137 | 143 | 1 | 0 | 0 | 4 | 5 | 3 | 3 | 0 | 18 | 24 |
| Arkansas | 9 | 5 | 3 | 1 | 30,434 | 56 | 52 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 9 | 10 |
| Mississippi | 9 | 4 | 0 | 5 | 63,919 | 58 | 30 | 0 | 0 | 0 | 5 | 5 | 2 | 0 | 0 | 24 | 26 |
| Southeastern States | 1 | 0 | 1 | 0 | 1,820 | 6 | 9 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 3 | 5 |
| Montana | 3 | 2 | 0 | 1 | 8,474 | 26 | 24 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 7 | 9 |
| Wyoming | 9 | 5 | 0 | 4 | 57,588 | 92 | 78 | 0 | 0 | 0 | 1 | 1 | 8 | 0 | 1 | 14 | 23 |
| Colorado-Utah | 11 | 7 | 0 | 4 | 58,052 | 71 | 31 | 3 | 0 | 0 | 3 | 6 | 6 | 0 | 2 | 22 | 30 |
| New Mexico | 14 | 11 | 2 | 1 | 80,862 | 114 | 89 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 9 | 12 |
| California | 40 | 31 | 0 | 9 | 146,870 | 310 | 230 | 3 | 0 | 0 | 7 | 10 | 12 | 0 | 0 | 56 | 68 |
| North Dakota | 1 | 1 | 0 | 0 | 8,595 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 |
| Miscellaneous (Md.) | 1 | 0 | 1 | 0 | 3,970 | 8 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 3 |
| Total United States | 831 | 444 | 58 | 329 | 3,626,510 | 5,981 | 5,071 | 31 | 0 | 4 | 151 | 186 | 176 | 13 | 30 | 1,109 | 1,328 |
| Total previous week | 917 | 521 | 65 | 331 | 3,798,568 | | | 25 | 2 | 4 | 164 | 195 | 145 | 13 | 26 | 957 | 1,141 |
| Total February 17, 1951 | 603 | 354 | 44 | 205 | 2,475,601 | | | 18 | 1 | 1 | 101 | 121 | 169 | 10 | 30 | 830 | 1,039 |

Service wells included: *6, †12, ‡2, §1.



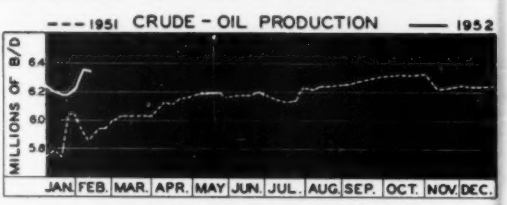



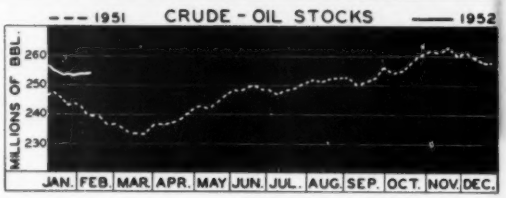




## DAILY AVERAGE PRODUCTION FOR WEEK

| | Feb. 16, 1952 Crude oil | Lease condensate | Total | Feb. 9 total |
|---|---|---|---|---|
| Alabama | 2,700 | | 2,700 | 2,700 |
| Arkansas | 76,435 | 4,565 | 81,000 | 80,950 |
| California | 978,600 | | 978,600 | 979,200 |
| Colorado | 78,100 | | 78,100 | 78,500 |
| Eastern | 57,900 | | 57,900 | 57,900 |
| Florida | 1,700 | | 1,700 | 1,700 |
| Illinois | 161,600 | | 161,600 | 162,300 |
| Indiana | 28,700 | | 28,700 | 31,300 |
| Kansas | 319,800 | | 319,800 | 319,900 |
| Kentucky | 34,400 | | 34,400 | 35,600 |
| Louisiana | 617,850 | 39,250 | 657,100 | 656,950 |
| North Louisiana | 113,900 | 14,250 | 128,150 | 128,000 |
| South Louisiana | 503,950 | 25,000 | 528,950 | 528,950 |
| Michigan | 37,200 | | 37,200 | 37,700 |
| Mississippi | 89,250 | 4,325 | 93,575 | 107,075 |
| Montana | 23,600 | | 23,600 | 23,200 |
| Nebraska | 6,100 | | 6,100 | 6,200 |
| New Mexico | 157,825 | 300 | 158,125 | 158,225 |
| Oklahoma | 519,700 | | 519,700 | 518,400 |
| Texas | 2,873,175 | 46,550 | 2,919,725 | 2,919,725 |
| Dist. 1 | 32,900 | 225 | 33,125 | 33,125 |
| Dist. 2 | 166,500 | 4,000 | 170,500 | 170,500 |
| Dist. 3 | 473,950 | 24,625 | 498,575 | 498,575 |
| Dist. 4 | 262,500 | 5,200 | 267,700 | 267,700 |
| Dist. 5 | 62,725 | 375 | 63,100 | 63,100 |
| Dist. 6 | 124,050 | 4,325 | 128,375 | 128,375 |
| East Texas field | 271,300 | | 271,300 | 271,300 |
| Dist. 7-B | 88,500 | 125 | 88,625 | 88,625 |
| Dist 7-C | 136,700 | 6,775 | 143,475 | 143,475 |
| Dist 8 | 1,008,625 | 550 | 1,009,175 | 1,009,175 |
| Dist. 9 | 162,300 | 350 | 162,650 | 162,650 |
| Dist. 10 | 83,125 | | 83,125 | 83,125 |
| Utah | 4,100 | | 4,100 | 4,600 |
| Wyoming | 185,300 | | 185,300 | 188,000 |
| Total U. S. | 6,254,035 | 94,990 | 6,349,025 | 6,370,125 |
| Change from previous week, down | | | 21,100 | |
| Canada | 92,801 | | 92,801 | 92,801 |

Total U. S. production January 1-February 16 293,795,520 bbl.
Same period last year (crude plus cond.) 278,306,350 bbl.



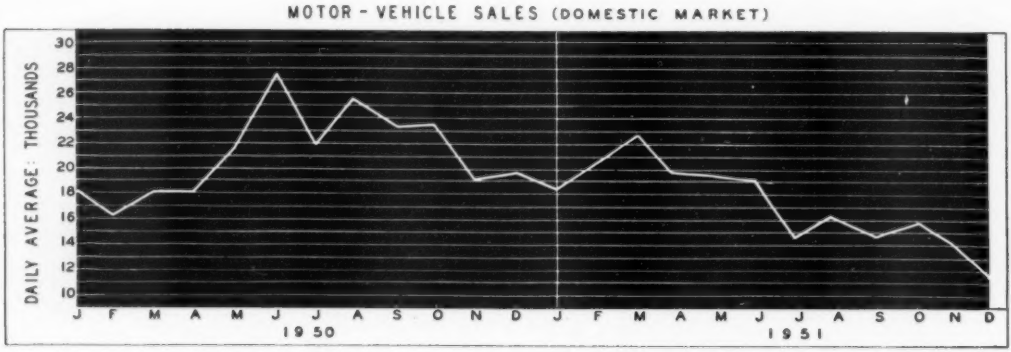



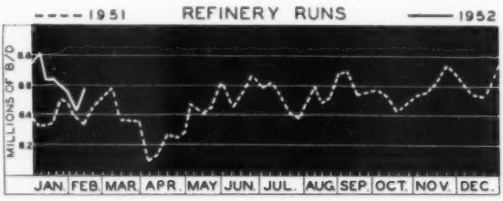

### CRUDE-OIL STOCKS BY STATES OF ORIGIN*

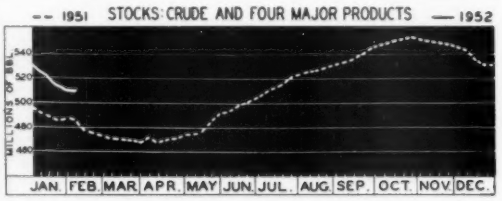
(Thousands of barrels)

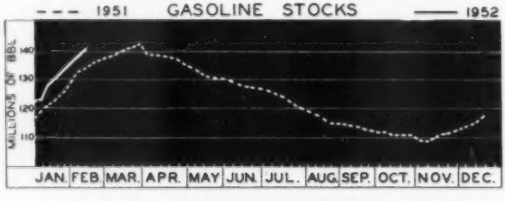
| | Feb. 9, 1952 | Feb. 2, 1952 | Feb. 10, 1951 |
|---|---|---|---|
| Pennsylvania Grade | 2,087 | 1,988 | 2,116 |
| Other Appalachian | 1,982 | 1,960 | 1,287 |
| Illinois, Indiana, Michigan | 11,427 | 11,303 | 9,996 |
| Arkansas | 2,951 | 2,895 | 2,757 |
| Louisiana | 13,659 | 13,756 | 13,607 |
| North | 2,724 | 2,762 | 2,701 |
| Gulf | 10,935 | 10,994 | 10,906 |
| Mississippi | 3,601 | 3,646 | 3,296 |
| New Mexico | 7,442 | 7,261 | 6,854 |
| Oklahoma and Kansas | 39,709 | 40,042 | 37,035 |
| Texas | 121,051 | 121,601 | 110,967 |
| East Texas Proper | 11,026 | 10,616 | (†) |
| West Texas | 54,940 | 55,517 | (†) |
| Texas Gulf | 25,325 | 24,668 | (†) |
| Other Texas | 29,760 | 30,800 | (†) |
| Rocky Mountain | 13,881 | 13,358 | 12,319 |
| California | 30,945 | 30,534 | 31,597 |
| Foreign | 6,129 | 6,466 | 7,042 |
| Total | 254,864 | 254,810 | 238,873 |

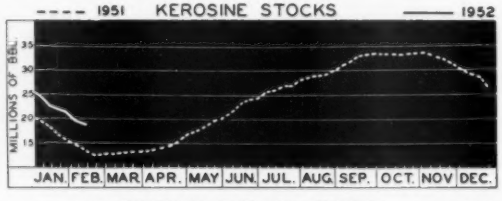
*Bureau of Mines. †Not comparable with current week.

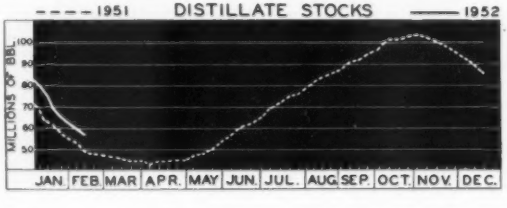


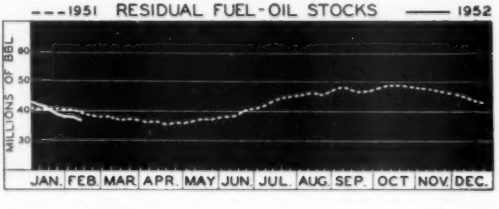



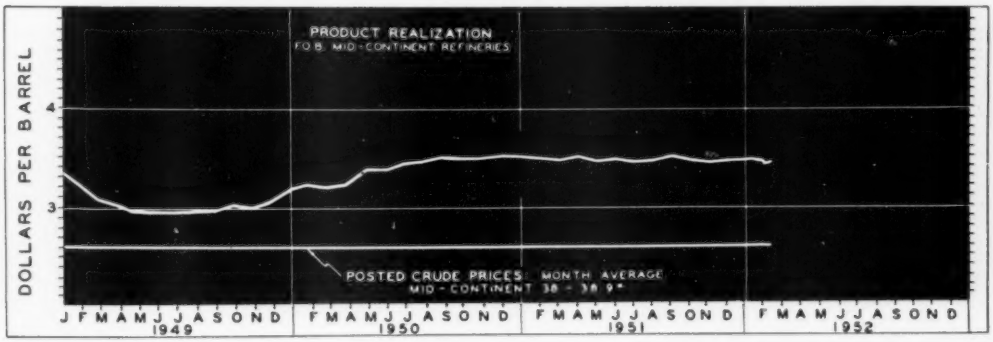




## A.P.I. REFINERY REPORT, FEBRUARY 16

(Thousands of barrels)

| District— | Daily avg. crude runs | Daily average production: Gasoline* | Kerosine | Distillate | Residual | Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline† | Kerosine | Distillate | Residual | Bureau of Mines, February 1951: Daily avg. crude runs | Daily average production: Gasoline* | Kerosine | Distillate | Residual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East Coast | 955 | 378.4 | 42.1 | 252.0 | 225.3 | 24,324 | 7,145 | 17,284 | 9,291 | 1,008 | 376.6 | 53.0 | 255.2 | 244.1 |
| Appalachian: | | | | | | | | | | | | | | |
| District 1 | 112 | 44.0 | 7.9 | 19.0 | 16.9 | 2,976 | 369 | 671 | 477 | 98 | 38.8 | 4.8 | 19.1 | 13.1 |
| District 2 | 87 | 41.3 | 4.1 | 13.1 | 22.6 | 1,334 | 152 | 391 | 148 | 80 | 34.1 | 5.2 | 10.4 | 20.5 |
| Ind., Ill., Ky. | 1,234 | 675.9 | 87.7 | 211.7 | 197.7 | 33,594 | 4,273 | 10,871 | 5,562 | 1,256 | 613.5 | 81.1 | 254.3 | 198.7 |
| Okla., Kans., Mo. | 549 | 307.0 | 15.3 | 140.6 | 64.8 | 16,528 | 1,101 | 7,180 | 1,423 | 543 | 276.8 | 17.0 | 131.7 | 80.9 |
| Inland Texas | 250 | 182.1 | 11.3 | 42.3 | 41.4 | 5,455 | 365 | 1,252 | 958 | 230 | 136.8 | 13.6 | 35.0 | 45.8 |
| Texas Gulf Coast | 1,638 | 741.9 | 115.6 | 437.3 | 254.0 | 24,763 | 2,695 | 8,906 | 5,848 | 1,538 | 636.5 | 143.0 | 371.7 | 268.6 |
| La. Gulf Coast | 538 | 196.9 | 36.0 | 161.7 | 74.4 | 7,851 | 1,580 | 2,583 | 1,924 | 507 | 227.7 | 69.0 | 130.2 | 70.7 |
| N. La. and Ark. | 80 | 33.7 | 7.0 | 17.9 | 9.4 | 3,106 | 492 | 975 | 172 | 80 | 29.4 | 8.3 | 20.7 | 9.9 |
| Rocky Mountain: | | | | | | | | | | | | | | |
| New Mexico | 17 | 9.7 | | 2.0 | 3.9 | 162 | | 56 | 30 | 15 | 7.9 | 5 | 2.5 | 3.7 |
| Other Rocky Mtn. | 218 | 98.1 | 6.9 | 46.7 | 49.3 | 5,378 | 223 | 1,472 | 1,020 | 221 | 107.8 | 8.2 | 41.5 | 49.1 |
| California | 913 | 393.1 | 9.0 | 154.6 | 351.4 | 15,450 | 259 | 5,631 | 10,568 | 986 | 419.9 | 6.1 | 147.0 | 376.9 |
| February 16, 1952 | 6,591 | 3,102.1 | 342.9 | 1,498.9 | 1,311.1 | 140,921 | 18,654 | 57,272 | 37,421 | 6,562 | 2,905.8 | 409.8 | 1,419.3 | 1,382.0 |
| February 9, 1952 | 6,421 | 3,063.7 | 376.0 | 1,506.3 | 1,272.4 | 138,896 | 19,261 | 60,308 | 37,799 | | | | | |
| February 17, 1951 | 6,444 | 2,917.9 | 414.9 | 1,347.1 | 1,315.6 | 134,598 | 13,314 | 49,420 | 39,874 | | | | | |

*At refineries including natural blended. †Finished and unfinished.




**In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.44 for week ended February 9, $3.43 for previous week, and $3.50 for February 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.**

## REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of February 20, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

### GASOLINE, KEROSINE, AND FUEL OILS

| | Mid-Continent Group 3 | New York Harbor (barge) | Texas Gulf Coast |
|---|---|---|---|
| Regular gasoline, 80-82 octane | 10-10¼ | 12-12.75 | 10¾-11 |
| Premium gasoline, 86-88 octane | 11-11⅜ | 13.5-13.75 | 11¾-12 |
| 42-44 w.w. kerosine | 9-9¼ | 10-10.1 | 9 |
| No. 2 straw fuel oil | 8-8⅜ | 9-9.25 | 8 |
| No. 6 residual | $1.50-1.55 | $2.45-2.60 | $1.75-1.90 |

### NATURAL GASOLINE

| | Group 3 | North Texas | N. La |
|---|---|---|---|
| Grade 26-70 | 6⅞ | 6⅞ | 6⅝ |
| Grade 18-55 | 8.25 | 7.75 | 8.0 |

### LUBRICATING OILS

**South Texas**

| | |
|---|---|
| 200 vis., No. 2-3 neutral | 13-13.5 |
| 750 vis., No. 3-4 neutral | 16 |
| 2,000 No. 5-6 neutral | 18-19 |

### LUBRICATING OILS

**Mid-Continent**

| | |
|---|---|
| 150-160 vis., D bright stock, 0-10 pp. | 29 |
| 200 vis., No. 3 neutral, 0-10 pp. | 16.5-17.5 |

**Western Pennsylvania**

| | |
|---|---|
| 145-155 vis., 10 p.t. bright stock | 32.5 |
| 180 vis., 0 p.t. neutral | 31.5 |

### WAX

**Mid-Continent**

| | |
|---|---|
| 132-134 A.M.P. | 5.5 |

SOME of the lack of activity on the Mid-Continent market for the past week has been due to the threatened strike by refinery workers.

All refined products in the Mid-Continent tend to be soft because of excess inventories. Following the warm weather in January, light and heavy fuel prices moved still lower as suppliers tried to reduce stocks. Consumer demand for these products is still light, but the possibility of a refinery strike has caused some suppliers to delay the all-out push to cut inventories.

Refinery runs in District 2 have been averaging about 1,880,000 bbl. daily. If half of this capacity were closed by strikes, product output in the district would be cut 940,000 bbl. daily. Since major product stocks in District 2 are about 15,000,000 bbl. more than at this time last year, it would take a 16-day strike of half the district's capacity or an 8-day strike at all plants to cut stocks back to last year's level.

However, the combination of a short strike and a few weeks of very cold weather would move most of the excess products in District 2. Since there is always a possibility of some good fuel-oil weather in March most suppliers have refrained from forcing any surplus on the northern market. Distillates are moving to regular customers and small amounts are on the spot markets at prices below the lows, but dumping on the normal market has been limited.

Some kerosine and No. 2 distillate from inland refineries moved to the Gulf Coast within the past week. However, only shipments that could be confirmed were from the eastern areas of Texas where freight rates to the gulf are more favorable than from Oklahoma refineries. No new sales of heavy fuel for movement to the Gulf Coast were reported. However, some of the earlier sales covered shipments through the summer months.

The truce in the New Jersey gasoline price war did not last long. Prices were established at 19 cents a gallon late in the second week of February, but were reported back down to 13.9 cents in Bergen County by February 17.

## CRUDE PRICES

### GRAVITY SCHEDULE

| | Signal Hill, Calif.‡ | Okla-homa, Kansas | Gulf Coast Tex.* | West Tex† |
|---|---|---|---|---|
| 18-18.9 | $1.93 | | | |
| 19-19.9 | 1.98 | | | |
| 20-20.9 | 2.03 | $2.25 | | $2.12 |
| 21-21.9 | 2.07 | 2.27 | | 2.14 |
| 22-22.9 | 2.12 | 2.29 | | 2.16 |
| 23-23.9 | 2.18 | 2.31 | | 2.18 |
| 24-24.9 | 2.24 | 2.33 | $2.56 | 2.20 |
| 25-25.9 | 2.30 | 2.35 | 2.58 | 2.22 |
| 26-26.9 | 2.36 | 2.37 | 2.60 | 2.24 |
| 27-27.9 | 2.41 | 2.39 | 2.62 | 2.26 |
| 28-28.9 | 2.46 | 2.41 | 2.64 | 2.28 |
| 29-29.9 | 2.52 | 2.43 | 2.66 | 2.30 |
| 30-30.9 | 2.57 | 2.45 | 2.68 | 2.32 |
| 31-31.9 | 2.62 | 2.47 | 2.70 | 2.34 |
| 32-32.9 | 2.68 | 2.49 | 2.72 | 2.36 |
| 33-33.9 | | 2.51 | 2.74 | 2.38 |
| 34-34.9 | | 2.53 | 2.76 | 2.40 |
| 35-35.9 | | 2.55 | 2.78 | 2.42 |
| 36-36.9 | | 2.57 | 2.80 | 2.44 |
| 37-37.9 | | 2.59 | 2.82 | 2.46 |
| 38-38.9 | | 2.61 | 2.84 | 2.48 |
| 39-39.9 | | 2.63 | 2.86 | 2.50 |
| 40 and above | | 2.65 | 2.88 | 2.52 |

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California

## FLAT CRUDE PRICES

Representative posted schedules per barrel.

| | |
|---|---|
| Kettleman Hills, California* | $2.80 |
| Louisiana: | |
| Beauregard Parish | 2.68 |
| Cotton Valley (distillate) | 2.85 |
| Cotton Valley (crude) | 2.70 |
| Texas: | |
| East Texas | 2.65 |
| Pecos County (Yates) | 2.35 |
| Conroe | 2.83 |
| Van | 2.48 |
| Pennsylvania Grade: | |
| Bradford | 4.25 |
| Southwest Pennsylvania | 3.82 |
| West Virginia | 3.76 |
| Illinois Basin | 2.77 |

*37°-37.9°.

# EQUIPMENT MEN . . . in the News

## Schlumberger Makes Three Changes in Field Personnel

R. D. FORD

Schlumberger Well Surveying Corp. has announced three important changes in its field personnel.

R. D. Ford has been promoted to vice president and general manager of Schlumberger Surenco, which operates in South America. His headquarters will be in Caracas, Venezuela. C. K. Ruddick has been made manager of the Mid-Continent area comprising Kansas and Oklahoma, with headquarters in Tulsa. J. A. Bodin has been named manager of the newly created West Texas area, which consists of the Permian basin and North Texas central divisions, with the area office in Fort Worth.

C. K. RUDDICK

J. A. BODIN

Ford began his service with Schlumberger in July 1936 and has worked in Bakersfield, Coalinga, and Long Beach, Calif. He also served for a period in the Houston headquarters before going to Tulsa in March 1949 as area manager.

Ruddick joined the company in February 1936. He has served in Illinois, Texas, and since May 1949 in Tulsa as assistant manager of the Mid-Continent area.

Bodin joined Schlumberger in France in January 1933, and transferred to the United States in 1935. He has served successively as district manager at Hutchinson, Kans., McAllen, Tex., Houma, La., and Corpus Christi, Tex.

## Universal Atlas Elects Five Executives to Higher Office

Five executives have been elected to higher office by directors of Universal Atlas Cement Co., according to Blaine S. Smith, president.

Effective December 1, George H. Reiter, vice president and general sales manager, was elected to the newly created office of executive vice president; Fred T. Wiggins, vice president and assistant general sales manager, was made vice president and general sales manager; Charles B. Baker, assistant to president and secretary, was elected vice president and general attorney; Donald C. Leo, assistant secretary, was named secretary, and Attorney Edward D. Depew was elected assistant secretary.

These five executives will maintain headquarters in New York City.

## Southern Engine Elects Wommack President

Douglas N. Wommack, who has been with Southern Engine & Pump Co. for 33 years, has been elected president of that company. Wommack also served as vice president of Southern Engine 14 years.

D. N. WOMMACK

Wommack has been closely associated with the oil industry for many years.

Southern Engine & Pump Co. is distributor of Le Roi engines and various lines of nationally known pumps.

## Meyer Is Appointed Hughes Tool Ad Manager

G. J. MEYER

Appointment of G. J. (Gus) Meyer as advertising manager of the Hughes Tool Co. has been announced by M. E. Montrose, vice president of sales.

Meyer began with the company in 1917 in the general office at Houston, and successively held positions in the shipping and accounting departments. In 1927 he was transferred to the sales department and later became assistant to the sales manager.

## Crane Is Appointed Chief Engineer for Martin-Decker

E. L. Decker, president of Martin-Decker Corp., Long Beach, Calif., has announced the appointment of Frank Crane as chief engineer.

After working in the drilling department of the Continental Oil Co. of California, Crane graduated from Colorado School of Mines where he majored in petroleum engineering. For the past 6 years he has been division engineer at Los Angeles for Oil Well Supply Co.

## Bovaird Key Personnel Attend Management Meeting

At an unusual management meeting of the Bovaird Supply Co. in Tulsa, Davis D. Bovaird, president of the firm, presented the story of the "Past, Present, and Future of the Bovaird Supply Co." The meeting marked the beginning of the company's 81st year of service to the oil industry.

Sessions were conducted by R. E. Batchelor, general manager of stores, R. M. McMahan, secretary and director of purchases, and T. H. Trower,

*The management meeting of Bovaird Supply Co., planned and conducted by President Bovaird and Roscoe G. Ayers, vice president and general manager of sales, was attended by 60 key personnel from four states, including district managers, store managers, department heads, and company officials.*

treasurer. Department heads, store, and district managers and others gave talks followed by question and answe rperiods.

During the management meeting, Mitchell Tucker, vice president, and John Reilly, Mid-Continent manager of The Oil and Gas Journal, presented a review of 1951 in the oil industry and forecast for 1952.

## Butler Is Named to Presidency of McEvoy Co.

G. A. BUTLER

At a recent meeting of the stockholders of McEvoy Co., Houston, George A. Butler was elected president of the company replacing Gus S. Wortham who resigned December 31, 1951.

Butler's interests include being a director of the National Bank of Commerce, the American General Insurance Co., Braniff Airways, the Longhorn Portland Cement Co., and Texas Eastern Transmission Corp.

Butler moved to Houston in 1925 where he joined the old law firm of Huggins, Kayser and Lidell. He established his own firm of Butler and Binion in 1941.

## Randolph, Smith on Trip to South America for Oil Base

*Thad Randolph, vice president in charge of sales for Oil Base, Inc., and Elmer Smith, manufacturers' representative for Oil Base in South America, leave for a visit to oil fields in Venezuela. Randolph will return to the States by way of Mexico City where he will visit Gus Saavedra and Sam Landis, representatives for Oil Base in Mexico. Smith is returning home after an extended trip to the states where he received additional training and information regarding new Oil Base products and applications.*

## Mission Sales Organization Holds Annual Meeting

*The sales organization of the Mission Manufacturing Co. gathered at the company's plant at Houston from January 23-26 for its annual sales meeting. Present were, front row: O. K. Ryan, D. J. Ollre, Lonnie M. Roberson, F. S. Mims, R. E. Hardy, I. D. Abshire, Jack Bannister, Joe Scalise, R. M. Wood, E. L. Brown, Robert L. Creasy, J. H. Meek, and S. L. Heidemann. Back row: A. E. Higginbotham, Charles W. Fryar, L. L. Roberson, Ted R. Fullinwider, Cobb L. Turner, D. E. Price, J. W. Holloway, Melvin C. Davis, R. L. Faris, W. T. Campbell, executive vice president and sales manager; Dudley C. Sharp, president; and J. E. Young. Absent were: W. C. Underwood, assistant sales manager; J. S. Stewart, and Tony Volotko.*

## Du Pont Announces Four Advancements

Four members of E. I du Pont de Nemours & Co.'s Petroleum Chemicals Division were advanced to new posts, effective January 1.

T. Baldwin Prickett was named planning manager; Robert F. Harwick became sales promotion manager; Richard O. Bender was appointed assistant technical manager, and Arthur F. Bowe, formerly manager of the Eastern District Laboratory, at Deepwater Point, N. J., was appointed laboratory coordinator.

Prickett came with Du Pont in 1946 as a petroleum refining consultant. Prior to this he was employed by the Pennsylvania Salt Manufacturing Co., Socony-Vacuum Oil Co., Inc., and Houdry Process Corp.

Harwick has been engaged in sales promotion work since joining Du Pont in 1950. He was formerly employed by the advertising department of Gulf Oil Corp. and later served as West Coast editor of The Oil and Gas Journal.

Bender came with Du Pont in 1941 and became head of the Chemical Division petroleum laboratory. From 1931 to 1941 he was with the Sinclair Refining Co.

Bowe joined Du Pont in 1947 as manager of the Eastern District Laboratory. In 1939 he went with Cities Service Oil Co. where he was employed before joining Du Pont.

## Jones Is Made Export Manager of Baroid Sales

L. W. JONES

D. T. FOWLER

L. W. Jones was recently promoted to the position of export manager at Baroid Sales Division, National Lead Co., Houston.

Jones began his oil field experience with Reed Roller Bit Co. in 1934 and subsequently worked in major oil fields of Texas, Louisiana, and Oklahoma. He joined Baroid in 1946 as a mud engineer. His initial assignment was in the Gulf Coast region, but he later spent considerable time in Mexico and South America as a consultant on unusual drilling mud problems. Following his new appointment at Baroid, Jones visited Mexico City and Tampico to study new developments and problems in that area.

Baroid Sales Division has also announced appointment of Donald T. Fowler as advertising manager in Houston. Experienced in the oil industry since 1940, Fowler has been associated with the Axelson Manu-

facturing Co., Byron Jackson Co., and was with the advertising department of Lane-Wells Co. for several years before joining Baroid.

Another release advises that James M. Bugbee, Jr., has been transferred to the advertising department of Baroid Sales Division, Houston, to assist in the preparation of the firm's technical publications relating to oil well drilling muds, well logging, and testing equipment. Bugbee has been with Baroid since 1947. His previous experience with the company includes well logging work in the southern half of the United States and mud engineering service in North Central Texas oil fields.

## Superior Combustion Names Fricke to Executive Staff

George A. Fricke, formerly with Griscom-Russell Co., has joined the executive staff of Superior Combustion Industries, Inc., as manager of the heat - exchanger division.

Fricke will direct the activities of this division from the executive offices of the company in New York.

## Hendryx Is Named to Sales Engineer Post for Beaird Co.

John Hendryx, formerly design and estimating engineer of J. B. Beaird Co., Shreveport, has been appointed sales engineer for packaged compressor plants, according to a recent announcement by J. L. Tullis, general manager of sales.

Before joining the Beaird organization, Hendryx spent 2 years with Texas Eastern Transmission Corp. and has held positions as field engineer for a Texas oil-producing company and as research engineer for an engine manufacturer.

## Pioneer Rubber Promotes Jackson to Top Position

H. T. JACKSON

W. S. LONG

Harry T. Jackson, manager of Pioneer Rubber Mills' Los Angeles branch for the past 11 years, has been promoted to assistant general sales manager at San Francisco.

Jackson has been with Pioneer for over 30 years, during which time he has had experience in nearly all Pioneer departments.

William S. Long has been appointed new manager of the Los Angeles branch and sales headquarters for Southern California, Arizona, and Nevada.

Pioneer Rubber Mills manufactures industrial rubber belting and hose, fire hose, packing, and related items.

## Carter-Jones Is Named By Fisher Governor Co.

Fisher Governor Co., Marshalltown, Iowa, has announced the appointment of Carter-Jones Co., Los Angeles, as exclusive agents for Fisher automatic controllers in southern California.

The new firm is headed by Fred G. Carter and B. R. Jones, both of whom were formerly associated with Fisher Governor and California Specialties Co., former agent, until they recently assumed management.

Carter joined Fisher in 1931 as a research and design engineer at Marshalltown. In 1938 he became a sales engineer for California Specialties, and in January 1946 was made manager.

Jones joined Fisher in 1940 as a research engineer and from 1947 to 1950 was a sales engineer, largely working in the Mid-Continent. Most of 1950 he spent in England and Europe, serving as a consultant in the construction of a London plant to manufacture Fisher equipment and in setting up a European sales organization. In March 1951 he joined California Specialties as a sales engineer.

## Simpson to Head Finance Committee of Bechtel Corp.

J. L. SIMPSON

S. D. Bechtel, president of Bechtel Corp., has announced the election of John L. Simpson as chairman of the finance committee. Prior to this appointment, Simpson was executive vice president of J. Henry Schroder Banking Corp. and Schroder Trust Co., New York, with which he has been connected since 1925. He will continue as a director of the two banking organizations.

Simpson has been a director of Bechtel Corp. since 1945. In addition, he has served as an officer or director of various domestic and international corporations, including chairman of the board, International Holdings, Ltd., and Hydro-Electric Securities Corp. He will make his headquarters in San Francisco where Bechtel's principal office is located.

Bechtel Corp. and its several affiliates specialize in engineering and construction throughout the United States and various foreign countries.

## Cooper-Bessemer Adds To Shreveport Staff

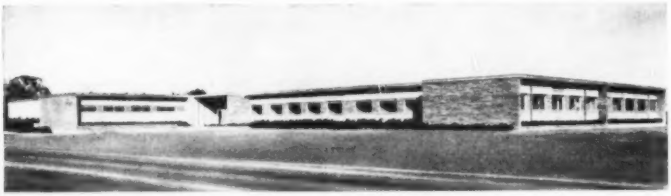
T. M. LAMBERTH

Appointment of T. M. Lamberth, Jr., to its Shreveport, La., office has been announced by Stanley E. Johnson, vice president of The Cooper-Bessemer Corp., Mount Vernon, Ohio. The assignment as sales and engineering representative will be under the direction of A. K. DeFrance, branch manager of the company's office and warehouse facilities in Shreveport.

Prior to joining Cooper-Bessemer, Lamberth was a sales engineer with Joseph A. Coy Co. and Arrow Industrial Manufacturing Co., both manufacturers of heat-transfer equipment.

Lamberth's activities will be devoted principally to the engineering application of gas, gas-diesel and diesel engines, as well as compressors

## Houston Branch of Lummus Co. Occupies New Building



*The Lummus Co. moved its Houston branch organization into a new office building recently completed for the company on February 1, followed by an open-house reception. The new branch houses a heavy concentration of design, engineering, and construction functions, supported by various service departments. C. A. Barrere, vice president, is in charge of the Houston office.*

and pumps widely used in the transmission of gas and oil in petroleum and chemical processing.

## National Makes Olson An Asst. General Manager

C. K. OLSON

Charles K. Olson has been appointed assistant general manager of The National Supply Co.'s engine division, Springfield, Ohio, it was announced by F. Howard Kilberry, general manager.

For the past 19 years Olson was associated with The Whitcomb Locomotive Co., division of Baldwin-Lima-Hamilton Corp. He was assistant vice president and general manager of that company when he resigned.

New staff assistant to the general manager is P. W. Place. Place joined the company in 1941. Following a series of engineering positions he took charge of all field service and will continue to handle this along with his new duties.

J. D. Myers has been named general superintendent. Myers joined National in 1936 as a drilling-machine operator and became machine-shop supervisor in 1942. His new assignment gives him direct charge of all plant functions, including jurisdiction over all shifts.

Newly appointed general superintendent for all night-shift operations is P. A. Groeber, who joined the company in 1934 as a toolmaker inspector and since 1941 had been foreman of the machine shop.

## Texas Electric Steel Enlarges Houston Plant

*Texas Electric Steel Casting Co. has added 60 ft. of floor space to its facilities at the Houston plant. Production at Tesco at present is running approximately 1,000 tons a month. The foundry is equipped with modern acid and electric-arc type furnaces, molding machines, and core blowers.*

## Happy Personnel Meet in Tulsa for 3-Day Session

*Executives, sales and technical men attending Happy Co. annual sales meeting were, front row: Ben Shelton, district manager, Kilgore, Tex.; R. B. (Cotton) Rundle, district manager, Seminole, Okla.; Roy Lindley, secretary-treasurer, Tulsa; John Mahaffey, vice president manufacturing, Tulsa; Leo King, vice president and sales manager, Tulsa; and Ed Allan, manager mechanical goods department, Tulsa. Second row: Jack Simpson, district manager, Dallas; Hayden Parrent, district manager, Salem, Ill.; John Tinker, district manager, Tulsa; F. E. (Dusty) Rhoads, district manager, Pampa, Tex.; Harold Ashworth, assistant district manager, Wichita Falls, Tex.; E. L. (Bus) Williams, district manager, Wichita, Kans.; Orville L. Smith, chief sales engineer, Tulsa; and W. H. Gorey, superintendent materials, Tulsa. Third row: F. W. (Rowdy) Robson, chief mechanical engineer, Tulsa; Charles Stanley, assistant district manager, Odessa, Tex.; L. E. Allen, sales engineer, Tulsa; Jim Lee, sales engineer, Tulsa; Murray Carr, chief engineer, cooler manufacturing division, Tulsa; John W. Ritter, district manager, Odessa; Wiley Sweavenger, purchasing agent, cooler manufacturing division, Tulsa.*

Representatives of the Happy Co. from the Mid-Continent area convened in Tulsa recently for a 3-day session for the purpose of studying the problems of servicing the oil industry.

Paul E. Mahaffey, president, and Leo C. King, vice president in charge of sales, announced new and improved lines of industrial atmospheric coolers. These streamlined coolers are made in many designs of standard, master, and special structure units. The Happy Co. pioneered this particular type of cooling in 1937.

Equipment distributed by Happy also includes pumping units, flat belting, friction-type engine starters, weatherproof safety switch, sure-grip sheaves, bull-dog V-belts, belt dressing and tighteners, Vortox air cleaners, Murphy control switches, Floco oil-level-control assembly, stuffing-box rubbers, Hap-Alloy balls and seats, Little Giant polished-rod clamps, and transmission equipment.

Information on advances in belting and rubber mechanical goods was given to Happy personnel during the sessions by Ed Allan, Happy's liaison representative with Boston Woven Hose & Rubber Co.

## Kimray Names Hinkson

Kimray, Inc., Oklahoma City, manufacturer of gas regulators, liquid-level controllers and related oil-field equipment, announces the appointment of Hinkson Oil & Gas Instrument Co. as distributors serving Colorado, Wyoming, and Montana. The company was formed by R. H. Hinkson in 1950 and maintains warehouse stocks at Denver and Casper, Wyo.

## Grosse, Larkin Elected By Broderick & Bascom

D. LARKIN

At the regular annual meeting of the shareholders of Broderick & Bascom Rope Co., held in St. Louis in January, David Larkin, former executive vice president of the company, was elected to the board of directors.

A. A. Grosse, who has been assistant treasurer, was elected by the new board to the additional office of secretary, a position formerly held by Joseph H. Bascom, now executive vice president and treasurer. Grosse began with the organization in November 1925.

## Rolo Canadian Office Moved to New Quarters

Ron M. Helmer, Canadian representative for Rolo Manufacturing Co., recently moved his Calgary operation to new offices in the Union Building.

Prior to acquiring the Canadian agency for Rolo Manufacturing Co., Helmer organized Helmer Chemical Co., Ltd., in 1949, a company devoted to water treatment, of which he is president and sole owner.

Helmer's Rolo agency in Calgary will maintain a complete line of Rolo well checking equipment and will

maintain adequate facilities for servicing this equipment in the Canadian area.

## Smythe Elected President Power Crane & Shovel Ass'n.

C. B. SMYTHE

C. B. Smythe was elected president of the Power Crane and Shovel Association at its annual meeting in Washington, D. C., early in January. Smythe is president of the Thew Shovel Co., Lorain, Ohio, manufacturers of "Lorain" power shovels and cranes.

The Power Crane and Shovel Association is comprised of 16 manufacturers of power cranes and shovels in the classification known as "commercial sizes."

## Lane-Wells Names Higgs, Otis Vice Presidents

Morton T. Higgs and Dr. Russell M. Otis have been elected vice presidents of Lane-Wells Co., according to an announcement by Rodney S. Durkee, president. D. S. Jeppson, vice president, has been given added managerial responsibilities; L. H. Ingle has been appointed controller, and V. L. Forsyth has been made chief engineer.

Higgs was formerly with Sperry-Sun Well Survey Co. as Gulf Coast regional manager for 8 years before joining Lane-Wells as division sales manager at Houston in 1938. In 1939 he became Gulf Coast division manager and was manager of field operations for 5 years prior to being elected vice president in charge of field operations and sales.

Otis, as vice president in charge of engineering, research, and patents, is responsible for all phases of Lane-Wells engineering and research. Otis joined Lane-Wells as a research engineer in 1941 and headed the research and patent departments before gaining his present position.

Jeppson relinquished his duties as controller to Ingle. In his new duties Jeppson will have jurisdiction over the works manager, industrial-relations manager, controller, secretary-treasurer and chief statistician, purchasing agent, and the internal auditor.

## Clote Joins Tretolite Co.

John W. Clote has joined Tretolite Co. as field engineer in the McPherson, Kans., area. Ray Housley has joined the company as field engineer in the Mount Pleasant, Mich., area, succeeding Al Gates, who resigned to establish a business in Florida.

## Gulf Supply Holds Formal Opening at Houston

*Gulf Supply Co., Inc., were hosts at the formal opening of its office and warehouse in Houston. In attendance at this meeting were, top row: Johnny Andrews, vice president, First National Bank, Houston; Harry Cloninger, purchasing agent, Tennessee Gas Transmission Co.; J. B. Wilcox, assistant purchasing agent, Dow Chemical Co.; Jim Boaz, division manager, National Tube; Choyce Allison, assistant sales manager, Humble Oil & Refining Co.; R. C. Williams, vice president, Gulf Supply Co., Inc.; Howard Hicks, manager, Beaumont Chamber of Commerce; Phil Lipschultz, purchasing agent, Shell Oil Co.; Herman Iles, Magnolia Petroleum Co., Beaumont, Tex.; P. P. Butler, president, First National Bank, Houston; and Roy Maness, president, Gulf Supply Co. Bottom row: T. Deal Reese, district sales manager, Gulf Supply Co.; J. Leonard Caldwell, Shell Oil Co.; L. C. Carter, division engineer, United Gas Co., and Morris Biggs, purchasing agent, Stanolind Oil & Gas Co. J. W. Hart, not pictured, is store manager.*

## Tom Slick Elected to Dresser Industries Board

TOM SLICK

H. N. Mallon, president, Dresser Industries, Inc., Dallas, has announced the election of Tom Slick to its board of directors. Slick, well known in the oil industry, is the son of the late Thomas Baker Slick, Sr., who discovered Cushing field near Tulsa, out of which a multimillion-dollar fortune was built.

Tom Slick is a partner in Slick-Morman Oil Co. and Slick-Urschel Oil Co. He is the founder of the Foundation of Applied Research which was launched by his gift of a valuable oil property located in Tinsley field.

Slick is also a director of Slick Airways, Inc., Southern Equipment Co., National Bank of Commerce of San Antonio, and Hewgley Drilling Co.

Other directors of Dresser are Prescott S. Bush, partner, Brown Brothers, Harriman & Co., New York; Norman Chandler, president and publisher, Los Angeles Times, Los Angeles; C. Paul Clark, president, Clark Bros. Co., Inc., Olean, N. Y.; William V. Griffin, chairman, Brady Security & Realty Corp., New York; Henry P. Isham, president, Clearing Industrial District, Inc., Chicago; Willard M. Johnson, president, Magnet Cove Barium Corp., Houston; H. N. Mallon, president, Dresser Industries; William A. McAfee, McAfee, Grossman, Taplin, Hanning, Newcomer & Hazlett, Cleveland; John B. O'Connor, executive vice president, Dresser Industries; and Arthur R. Weis, president, Pacific Pumps, Inc., Huntington Park, Calif.

## R M Names Hazard to Head Packing Division

R. B. (Dick) Hazard has been appointed sales manager of the Packing Division, Raybestos-Manhattan, Inc., effective February 1, according to an announcement by George W. Marshall, Jr., vice president in charge of asbestos-product sales. Hazard will make his headquarters at R/M's Manheim, Pa., plant.

From 1934 to 1941 Hazard represented B. F. Goodrich Co. in St. Paul. From 1941 to 1943 he was associated with W. S. Nott Co., Minneapolis; in 1943 he joined Anderson Crane Rubber Co. and left that company in 1945 to join Raybestos-Manhattan where he represented the Asbestos Textile & Packing Division in the Minneapolis-St. Paul area, transferring to the Manhattan Rubber Division of R/M in 1948. In 1949 Hazard was advanced to manager of distributor sales, Western Division, of Manhattan Rubber Division with headquarters in Chicago.

*(Additional Equipment Men in the News on page 224)*

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FOR SALE by Owners—Complete Rotary Rig ready to drill; located Illinois; RL Cardwell Drawwks; 87-ft. Lee C. Moore Derrick; Wilson-Snyder Pump; Waukesha motors; Brewster Swivel; Gumbo Buster Table; 3½" Mod. Drill Pipe; 1951 Willys 4-wh. dr. 1-ton Pick-up truck; Also working interest sand well 46-acre lease. Address F. Heldt, Mt. Carmel, Ill., or Tel. 801—1120.

FOR SALE: Four Mayhew #1000 drills, two on 1948 International, one on 1950 Ford, all with water trucks, pipe and on good contracts. Box E-593, The Oil and Gas Journal, Tulsa, Okla.

ELECTRIC Generator Units: Immediate delivery on 3 KW, 6 KW, 10 KW, and 12 KW diesel units and 10 KW gas-gasoline-butane; all new Buda units, 125 volt DC, metal housed. Also new 125 KW, 900 RPM, 240/480 volt, 3 phase units with Buda convertible diesel or natural gas-butane engines. Buda Engine Sales & Service, 517 West Archer, Tulsa, Oklahoma.

10,000-FT., 5½-inch J-55 seamless casing shopped and tested. 10,000-Ft., 2-inch external upset tubing in excellent condition. 2 Bethlehem pumping units complete, 5,000 ft. capacity. P.O. Box 4343, Dallas, Texas.

WICHITA 50 Spudder tools and 5,000 feet of pipe consisting of 15-12-8-6- and 5-inch. F. E. Hunt, Adair, Iowa.

FOR SALE: Well Drilling Business—71-Star, Modernized #3 Keystone, Both Truck Mounted. Complete Tools, 4 to 20 inch. Physical Inventory $15,000. Nets $6,000 to $8,000 yearly. This is Industrial—No Pipe Worries. Sales Price: $11,000.00. Owner retiring. Write Box E-594, The Oil and Gas Journal, Tulsa, Oklahoma.

**FOR SALE NEW**
**2—Diesel Electric Generating Units**
Caterpillar D-8800 50 KW Continuous Rating. Mounted on steel base complete with radiator, control cabinet, silencer, electric starting and safety shutoff devices. Communicate with
**ARTHUR C. SIMMONS**
**Box 191, Bradford, Penn. Phone 3148**

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**FILTERS**

- 36" Shriver Press, washing, closed del., Celeron plates and frames.
- 36" Filter Press, open delivery, 27 frames, wood plates.
- 30" Sperry, Type 47, 26 frames, hydraulic closure.
- 8' x 12' Feinc, all steel.
- 8' x 10' Oliver, wood and steel. (3)
- 11'6" x 18' Oliver, all steel.
- 4' x 5' Oliver, SS and wood. (2)
- #7 Sweetland, 2" spacing, 28 leaves.

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*Machinery & Equipment Merchants*

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PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 45970, P.O. Box 151, Tulsa, Oklahoma.

7500' OF API Full Hole 4½" Drill Pipe. Graded and tested by Sonoscope engineers. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

FOR SALE: Westcott, Foxboro and Emco Gas Meters. Geo. R. Milner, Box 124, Okmulgee, Oklahoma.

FOR SALE at W. C. Norris Plant, Tulsa: 1,813 new 5½" OD 8 Round Thread ABIJ55 National Tube Seamless Steel Casing Couplings, Price $5.00 ea., all or any portion, Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FOR SALE: U-34 Unit Rotary Rig, C-150 pump, 5½" substructure, Lee C. Moore mast, 4200' of 4½" drill pipe, all complete, A-1 condition, eleven months old. H. Waggoner Drilling Company, Box 4657, Oklahoma City, Okla.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.
**H. H. COFFIELD**
**Attn.: W. H. ORR**
**Phones: 132—Rockdale, Texas**
**AT-3427—Houston, Texas**

## EQUIPMENT FOR SALE

AIR COMPRESSORS: Davey Model 160 V.D., 160 cu. ft., International Diesel powered; $2,250.00. Chicago Pneumatic, 160 cu. ft., Hercules Gasoline powered; $1250.00. Located Tulsa. Midwestern Drillers, 628 Wright Bldg., Tulsa, Oklahoma. Phone 4-5263.

FOR SALE: Wilson Giant Drawworks: 2 Buda JL-1335 Motors with chain compound drive. 1—Code Butane Tank. 4000' 4½" Drill Pipe. May be inspected while drilling 4000' wells near Hays, Kansas. Total price $17,000.00. Powell Drilling Company, 306 Derby Bldg., Wichita, Kansas.

BLOCKS, 1-2-3-4 sheaves and hooks for derrick use. Derricks and crown blocks. Everything for well drilling. New and used equipment. Pressey & Son, Pueblo, Colo.

C-37 WALKER-NEER Spudder, complete with 8,000 ft. lines, dog house, lights, 5 & 7 inch tools, control head, etc. Work-overs to 10,000 ft. First class condition. Reasonable. West Texas. Box E-629, The Oil and Gas Journal, Tulsa, Oklahoma.

**PIPE FOR SALE**

| | |
|---|---|
| 100,000' | 6" O.D. 11# PE Lapweld Pipe |
| 8,000' | 6" 10# T&C Lapweld Pipe |
| 6,000' | 8" O.D. 17# T&C Lapweld Pipe |
| 100,000' | 2⅜" O.D. 4½# T&C Lapweld Tubing |

**FRANK MORRIS & CO.**
**424 So. Cheyenne Ph. 2-6247**
**Tulsa, Oklahoma**

# DISMANTLING GASOLINE PLANT

**7—CLARK GAS ENGINE GAS COMPRESSORS**

One—230 H.P.—17x18x26x20
One—230 H.P.—17x18x24x20
One—230 H.P.—17x18x24x20
One—200 H.P.—16x7½x10x20
One—165 H.P.—17x6½x16x20
One— 80 H.P.—16x8½x20
One— 80 H.P.—16x7½x20

Complete and in good operating condition.
Full specifications available on request.

PROPANE and BUTANE STORAGE TANKS
TOWERS — VESSELS — PUMPS — BOILERS
INSTRUMENTS — PIPE — VALVES — FITTINGS, Etc.

This plant located near Benton, Illinois, ceased operating a few months ago due to shortage of natural gas.

Write for descriptive folder listing hundreds of other items.

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Kansas City 10, Mo.

Norman Strauss
Phone HArrison 1000

**Salesman on premises. Contact R. V. Crisp, Phone 1419 or 610, Benton, Ill.**

## EQUIPMENT FOR SALE

USED rotary and cable tool drilling tools wire lines. E. A. Kelly, Box 861, Oklahoma City. Phone 5-6407.

FOR SALE: 24 L Bucyrus Erie, Butane equipped, 1,000 gallon Butane tank, complete string of tools, Spang fishing tools, New lines, 300 feet of 10" casing, 800 feet of 8" casing, 850 feet of 7" casing, 1100 feet of 5½" casing, all J 55 seamless range 2, ran once. Oil field truck, all guaranteed A 1 condition. Address John I. Cooper, General Delivery, Owensboro, Ky.

EVERYTHING in Cable Drilling tools, new-used, 4600 items. Send for list. Tri-State Tool & Supply Co., Box 827, Parkersburg, W. Va.

ONE K. L. Cardwell Spudder with new 4000 ⅞ line 3" 4½" 6" tools, Steel Dog House, Junk rack, Light plant, 1½ ton Winch Truck. Complete, ready to run. Price $17,500.00. Located Mt. Carmel, Illinois, Box 58, Tele. 126R.

**FOR SALE**
**LINE PIPE COUPLINGS**

2", 2½", 3", 4", 6", 8", 10"—140D Drive 14" OD, Casing 5½" OD 8 Rd. and 11½V NEW, CLEAN, PERFECT.

**JULIUS M. FOGELMAN**
**1649 Perkiomen Ave., Reading, Penna.**

**FOR SALE**
**USED SEAMLESS STEEL TUBING**
**PLAIN AND BEVELED FOR WELDING**

*Ready for IMMEDIATE SHIPMENT*

150,000 ft.—1½" O.D. weighing approx. 2.14# ft.
100,000 ft.—2" O.D. weighing approx. 2.67# ft.
125,000 ft.—2¼" O.D. weighing approx. 3.00# ft.
50,000 ft.—3½" O.D. weighing approx. 5.00# to 5.50# ft.
120,000 ft.—4" O.D. weighing approx. 5.75# to 6.00# ft.
75,000 ft.—5⅝" O.D. and 5½" O.D. weighing approx. 10.00# ft.
(This 5⅜" and 5½" can be used as casing in shallow wells)

This material has never been underground, was formerly used for steam purposes, shows practically no pitting, every length will be tested for 850# hydrostatic pressure at our plant.

We carry large stocks of new and guaranteed used steel pipe and tubing up to 30" in diameter.

We have a large quantity of welded, riveted and bolted STEEL TANKS, in both new and used, suitable for regular storage and pressure. Also Wood TANKS, formerly used for beer storage.

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*(In "Our 77th Year")*
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**PArkview 6885**

## EQUIPMENT FOR SALE

FOR SALE: 15 new International Model U-9 Power Units equipped with Ensign Combination Carburetor, Twin Disc Clutch, Automatic Oil and Water Cut-Offs, Hood and Side Doors. Dealers' Cost. Call or write Jack Anderson Engine Company, Telephone No. 2021, Post Office Box 1290, Kilgore, Texas.

FOR SALE: Wilson Giant Draw Works with 2-JL-1335 Buda Motors compounded, motors recently overhauled and in A-1 condition. Total price $7,500.00. Glenn R. Nye Drilling Company, Drawer 30, Telephone 897, Hays, Kansas.

FOR SALE by owner: 5,000' rotary rig now running vicinity Wichita Falls, Texas. 96' jackknife derrick w/ 5' substructure, Wilson Giant drawworks w/ WAK Waukesha, new 220hp 212p Oilwell pump w/ V8 LeRoi 17" Oilwell rotary, Brewster H100 block & hook, 4000' 4½" full hole drill pipe. Complete equipment A-1 condition. Gray Drilling Company, 306 First National Bank Building, Wichita Falls, Texas. Phone 7292, 26158.

# PRESSURE VESSELS

1—4'-0" x 40'-0" Reaction Chamber, Wall Thickness 4 inches—Forged Steel Construction—GUNITE LINED.

1—5'-0" x 32'-6" x ⅞" Riveted & Welded Tower—5 trays spaced 20" Apart.

1—5'-0" x 30'-0" x ⅜" Riveted & Welded Tower with Tulsa Type Mist Extractor, 10 trays—spaced 20" apart.

1—6'-0" x 28'-0" x ⅜" Riveted Tower, 16 trays—spaced 16" apart.

2—9'-2" x 39'-0" x 1 ⅞", Riveted & Welded Vessels.

2—10'-0" x 30'-0" x ½" Riveted Stills.

1—10'-0" x 39'-9" x ⅞" x 1" Heads—Riveted Tower. 3 trays—63 C.I. Bubble Caps each—also 3 Baffle Plates.

**BROWN-STRAUSS CORPORATION**
**NORMAN STRAUSS**
**Phone HA-1000**
**P. O. Box 78**
**Kansas City, Mo.**

## EQUIPMENT FOR SALE

SALES and Rental of Cable Drilling and Fishing Tools, Casing and Equipment from the Southwest's largest stock of used Cable Tools. Degen Pipe & Supply Co., Tulsa, Oklahoma.

2 E K U Waukesha Motors w/ Twin Disc Clutches A1 Condition, 450' 6⅝" OD Drill Pipe and Joints, 1 66"—5 Sheave Traveling Block, 1 56"—4 Sheave Traveling Block, 1 48"—4 Sheave Traveling Block, 1 58"—12 Groove Sheave (D), 1 56"—9E Groove Sheave, 1 30"—5B Groove Sheave, 1 70 H.P. Boiler, A 1, 2 Sets Compound Rotating Elements mounted on Skids, 1 26" Gumbo Buster Rotary Table complete, A 1 condition, 1 4 Sheave Ideal Crown Block. H. M. Williams Drilling Company, 701 Bitting Building, Wichita 2, Kansas.

1—PDM 36 Emsco DWKS w/ 2-R61 Climax Engines, Drill Pipe, Collars, Kellys, Crowns, Rotary Tables, Traveling Blocks. Chapman Pipe & Supply, Oklahoma City, Okla. Ph. ME 8-1567, WI 3-0300.

USED well drilling equipment, fully reconditioned. Machines, tools, cable, drill pipe. Our prices will please you. Pressey & Son, Pueblo, Colo.

FOR SALE: 1 Emsco Rotary, 5500' with 2 13,000 caterpillar engines, 3300' 3½" drill pipe, Thyrite Generator, 2 doghouses, B-J Tongs, 18" Wilson-Snyder Pump, new wire line and regular equipment. Also one 36L Bucyrus-Erie complete with tools and new lines, dog house, forge and crane on single unit. Inspection invited. Box E-611, The Oil and Gas Journal, Tulsa, Oklahoma.

ONE 6' x 27½' National Separator & Treater, Cap. 3,000 Bbls. Model X C P. Low gravity, all fittings and connections, 60% of new price. Box 741, Ardmore, Okla.

TYPE K Rix High Pressure Three Stage Gas or Air Compressor for Research and Experimental Purposes, 5,000-lb. pressure. For Specifications, Price and other details, write C. W. Weathers, 2029 Santa Rosa St., Houston 23, Texas.

**FOR SALE: One 125 H.P. Allis-Chalmers 1170 RPM 220 Volt, 31 Amphere, Type A R code F, 3 phase, 60 cycle, 24 hour, 40 degree rise induction electric motor. Never used. In original crate, priced at $1500.00. Located Cushing Refinery, Cushing, Oklahoma. Contact Hutt, Deep Rock Oil Corporation, Box 1051, Tulsa, Oklahoma.**

FOR SALE: Two LI-000 Cummins Diesel Drilling Engines Complete with Air throttle actuators, Radiators, Heavy Skids, Less Power Take Off, in running condition—$4,000. Ingersoll Corporation, Shreveport, Louisiana.

FOR SALE: 45 Star Spudder with 4600 Caterpillar Diesel, with or without tools and engine. Phone 2029, Box 263, Independence, Kansas.

12,000' OF GOOD Used 6⅝" O.D. 18.97 Line Pipe, some with collars just taken out of a line; 18,000' of 4½" O.D. 10.79# some with collars; 7,500' of 3½" O.D. T. & C. Std. will sell or trade for other Pipe. A. A. Gilbert Pipe & Supply Co., Shreveport, La.

BUCYRUS-ERIE 24-L complete with all tools, lines, doghouse, water pump, light plant, 1½-ton truck and pipe trailer. Located near Robinson, Illinois. Write or call Buckeye Supply Company, Zanesville, Ohio.

## EQUIPMENT WANTED

WANTED: Bucyrus-Erie 48 or Walker-Neer S-33 with or without tools. Box E-599, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Complete Carbon Black Plant (Channel) Capacity About 20 Million Lbs./Yr. Offers With Full Details Box E-583, The Oil and Gas Journal, Tulsa, Oklahoma.

1,400 FEET or less 3½" EUE or 2⅞" EUE drill pipe, new or good used. One 30 foot 4¾" D drill collar, new or good used. Have PAD authorization for pipe. Box E-606, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED to buy by Eastern manufacturer of oil country equipment: Small machine shop, 2,500 to 5,000 sq. ft. floor space. Machine tolerances required .010". Write Box E-588, The Oil and Gas Journal, Tulsa, Oklahoma.

WE BUY well drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

# FOR SALE

| | | | |
|---|---|---|---|
| 1— | 24,903 gal. | welded steel tank, 14'8" dia. x 17' high | |
| 2— | 24,952 gal. | 14'3" x 17'5", | welded steel tank |
| 1— | 281,300 gal. | 41'5" x 34', | welded steel tank |
| 1— | 52,289 gal. | 22' x 20', | welded steel tank |
| 3— | 16,342 gal. | 24'10" x 10'7" | welded steel tanks |
| 1— | 83,153 gal. | 27'1" x 23' | welded steel tank |
| 1— | 72,222 gal. | 24'6" x 23' | welded steel tank |
| 1— | 171,165 gal. | 29'10" x 31'3" | welded steel tank |
| 1— | 58,752 gal. | 25' x 20' | welded steel tank |
| 1— | 52,346 gal. | 23'10" x 19'6" | welded steel tank |
| 1— | 12,051 gal. | 17'9" x 10'9" | welded steel tank |

**Price subject to prior sale, $15,000.00 for the entire lot, located at Heloise, Tenn.**

**ROGERS AND WRIGHT, INC.**
**216 West 2nd Street Tulsa, Oklahoma Phone 5-3229**

## EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANT TO HIRE—Some one to drill 1,000 foot oil test, or will buy small rotary. Lewis Short, Burrton, Kansas.

## BUSINESS OPPORTUNITIES

LONG established small but effective organization in California oil industry desires additional line of equipment preferably in engine or other machinery field. Can function as manufacturer's representatives or dealers. Box E-598, The Oil and Gas Journal, Tulsa, Oklahoma.

RELIABLE and established drilling contractor seeks partner with capital. Box E-610, The Oil and Gas Journal, Tulsa, Oklahoma.

ADDITIONAL Capital Needed for installing underground Butane, Propane and other hydrocarbon storage. Sound investment. Successful record. Security Underground Storage Co. Phone 2-4067. 615 Sunset Dr., Wichita Falls, Tex.

**WANT**
**N. Y. EXPORT REPRESENTATION?**

Long established and well known oil well equipment manufacturer who has maintained N. Y. export office and sales personnel for many years, is now in a position to handle additional representation in New York for high quality manufacturers of oil equipment items. If you're looking for increased export business, write for further information. All replies held in strict confidence.

**Box E-359, The Oil and Gas Journal, Tulsa, Oklahoma**

## HELP WANTED

# VENEZUELA

Oil Well Engineer. Experience in well perforating desirable. Good salary and liberal living allowance. Company house provided. Single or married. No children. Give full details on experience and education.

References required.

**Box E-596, The Oil and Gas Journal, Tulsa, Oklahoma**

MEDIUM SIZED independent oil company has openings for the following, with salaries above the industry level for such positions:

1. **FIELD MANAGER** to supervise all phases of a unit operation and pressure maintenance project. Prefer man 35-40 years old with technical training. Must have experience in all phases of unit operation.
2. **ACCOUNTANT** to supervise and prepare accounting records, including production accounting, gas and oil measurement records in field office.
3. **FIELD ENGINEER** for unit operations. Prefer petroleum engineer with 2-5 years field experience.

All applicants to any of the above are requested to give briefly their educational and professional background, as well as any military service and present military status. Interviews will be arranged for those having desired qualifications. All inquiries will be considered confidential.

**Reply to Box E-595, The Oil and Gas Journal, Tulsa, Okla.**

## HELP WANTED

**ENGINEERS, Executives, Technical Men. Salaried positions—$3000 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 334 Frick Bldg., Pittsburgh 19, Pa.**

SALES Engineer needed by prominent Mid-Continent area oilfield engine distributor. Must have actual experience in drilling engine applications and sales promotion. Excellent opportunity for qualified man. Reply will be held confidential; write to Box E-585, The Oil and Gas Journal, Tulsa, Oklahoma, giving full particulars of experience, education, etc.

**AGGRESSIVE independent oil company wants subsurface geologist with 3 to 5 years experience in subsurface mapping in North or West Texas area. Give full details of past employment, educational background and salary expected. Replies confidential. Box E-586, The Oil and Gas Journal, Tulsa, Oklahoma.**

WANTED: Assistant Drilling and Production Superintendent for Texas, Oklahoma and Kansas operations. Immediate responsibilities in Odessa territory. Qualifications required: Age limit 45, engineering degree preferred, with 10 years practical application and experience with rotary drilling, cable tool completions, remedial problems and workovers. Hill & Hill, 510-516 Life of America Building, Fort Worth 2, Texas. Telephone: EDison 9431.

GEOLOGIST with three to five years experience, for subsurface mapping in West Texas, Panhandle, and Southwest Texas. Subsurface experience desirable but not necessary. Write giving training, experience and salary desired. J. F. Hansard, Personnel Director, Lion Oil Company, El Dorado, Arkansas.

## INSTRUMENTATION ENGINEERS

**Qualified by actual experience in selection, design and layout of instruments for control of oil refinery and chemical process units.**

**Salaried position commensurate with experience; location in Boston. In reply please state educational qualifications, work experience (mentioning types of instruments), salary requirements and date available.**

**Present employers will not be contacted before personal interview.**

**Stone & Webster**
**ENGINEERING CORPORATION**
**49 Federal Street, Boston 7, Mass.**

## HELP WANTED

HARRY FERGUSSON Limited have a vacancy for a Senior Engine Designer to take charge of the engine design section. Applicants should have had previous experience in the design of tractor, car or commercial vehicle engines. Also ability to initiate and execute new projects. The position is a responsible one and has good future prospects. Applicants should send fullest particulars of their age, education, qualifications and practical experience and salary required to the Secretary, Harry Fergusson Ltd., Coventry, England.

PETROLEUM ENGINEER: Strong independent with substantial production Mid-Continent and Rocky Mountain areas requires services graduate Petroleum Engineer to assist with well completions, equipment installations, production and maintenance of statistical data. Must have at least three years practical experience. Headquarters Casper, Wyoming. Please state age, qualifications and starting salary expected. Address Box E-628, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Tool Pushers familiar with truck mounted portable drills, and who have had experience in shot-hole, core and shallow production drilling. A good job for the right man. Must have references. Box E-609, The Oil and Gas Journal, Tulsa, Oklahoma.

**PETROLEUM ENGINEER OR GEOLOGIST**

with broad general knowledge of the petroleum industry in East Texas, North Louisiana and South Arkansas, to fill position with well established firm in area. State qualifications in detail.

**Box E-614, The Oil and Gas Journal, Tulsa, Oklahoma**

# PETROLEUM ENGINEERS

Major Oil Company has openings for a number of Petroleum Engineers for service in South America & Middle East. Requirements: B.S. degree in P.E., M.E. or Chem.E.; to 3 yrs. Experience.

**GULF OIL CORPORATION**
**Foreign Production Div.**
**P.O. Box 35, N.Y. 4, N.Y.**

# ENGINEERS

Major Petroleum Refinery Construction Company located in New York City desires to add to its expanding staff. If you can qualify for one of the jobs listed below and are interested in a challenging opportunity please submit your resume in detail and past earnings record to the box number below. Our employes know of this ad.

SCHEDULING ENGINEER experienced in job scheduling preferably on petroleum or chemical plants starting with the engineering and proceeding through procurement and construction.

CONSTRUCTION SUPERINTENDENT must have experience in construction of oil refineries and the exercise of executive authority at job site. Must be able to travel.

ASSISTANT TO CONSTRUCTION AND PROCUREMENT SUPERVIOR requires supervisory field erection experience on oil refineries and chemical plants as well as some experience in procurement, expediting and inspection of refinery equipment. Headquarters in New York City with some travel required.

**Box E-534, THE OIL AND GAS JOURNAL, Tulsa, Oklahoma**

## HELP WANTED

COMPUTER—College degree and two years of experience as Computer and Observer on seismograph crew. To be given intensive training toward position of Party Chief. Write us giving full details of education and experience and salary expected. Geotechnical Corp., Box 7166, Dallas, Texas.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-616, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT Engineer, mechanical or chemical engineering graduate with several years experience on instrument maintenance and engineering, preferably in chemical plant or petroleum refinery. Age 26 to 35. Location, New Mexico. Box E-634, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Drillers who are familiar with portable drills such as Sullivan 200 and 300 or Failing 2500. Also familiar with shallow slim hole production drilling. Box E-608, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL INDUSTRY Employment Service, 405 Tuloma Building, Tulsa, Okla. 4-5974, Tom Robinson, owner. For technical and trained oil industry personnel. No fees.

## SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131. Ph. No. 131, Hobbs, New Mexico.

GRADUATE well known Eastern college, economics major, trained on Wall St., young married veteran, keen interest in oil business; start as executive's assistant, ability unlimited, will relocate. Box E-612, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY MANAGER, extensive experience, desires connection with independent company. Box E-601, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN 49 years of age desires position as supervisor railway tank car maintenance, approximately 28 years of experience. At present shop superintendent large repair shop. Box E-630, The Oil and Gas Journal, Tulsa, Oklahoma.

FIFTEEN years experience in Gas Accounting, Measurement, Contracts, Personal Contacts. Junior Executive, age 37, desires change. Excellent references. Box E-631, The Oil and Gas Journal, Tulsa, Oklahoma.

17 YEARS Oilfield Experience—Drilling and Production as well as Technical and Management. Desire connection with stable independent. Prefer Rky. Mtn. area. Box E-632, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer and Production Executive with wide experience in Domestic and Foreign Fields, desires affiliation with aggressive Independent. Box E-633, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN, age 54, recently laid off by Union Oil Co., of Cal. in N. Dak. Go anywhere. C. Campbell, 6075 Franklin Ave., Hollywood 28, Calif.

REFINERY MANAGER OR SUPT., small or medium-size company, can handle plant operations and refinery techniques; can direct chemical and products development work also. Highly experienced in light oils, lubricants and asphalts. B.S. degree, married, available now. Box E-625, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST: Well established, seeks connection with active Independent in West Central Texas area. Retainer or full time basis. Box E-626, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL Engineer, age 26. Married, 3½ years laboratory experience in large Mid-Western Refinery. One year sales experience as Lubrication Engineer. Desire responsible position in refinery or technical sales. Box E-627, The Oil and Gas Journal, Tulsa, Oklahoma.

## LEASE AND DRILLING BLOCKS

OVER 6400 acres to lease in Carson & Gray Counties, Texas. Near Production, acreage reasonable. Also 4 sections solid Block for drilling contract. Write S. K. Roach, Groom, Texas. P.O. Box 148, Groom, Texas.

JAMES A. ROSE Leases & Royalties, Williston Basin and other areas. 313 Colorado Bldg., Denver, Colo. Ph. KE 7354.

FOR a limited time NEW CAPITAL for operators or for purchase. If you have production and need new "easy term" working capital to refinance obligations, drill more wells, expand, or desire to sell, contact us for details. In reply don't give details—merely state size of lease, number producing wells, daily pipe line runs and whether prorated. Don't sacrifice before you contact us. Box E-624, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 240 Acre Lease Southwestern Young County, Texas, offsetting acreage with four pay zones, 380'-4,500'. Production on adjoining blocks on four sides. Geology good. Cash and Oil Payment. W. D. Keith, Radio Bldg., Phone 6640, Wichita Falls, Texas.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

HAVE over twenty thousand acres leases along Missouri River on North Dakota-South Dakota line. All ten year leases ten cent rentals. Interested in selling shooting option with right of selection. If interested write Box 107, El Dorado, Arkansas.

INVESTMENT funds wanted—From excess taxpayers by independent oil operator. For exploratory well drilling immediately. Geologically favorable. Illinois basin. Box E-569, The Oil and Gas Journal, Tulsa, Oklahoma.

**NORTH DAKOTA**
**LEASES and MINERALS**

Our latest lists with prices mailed on request. We solicit only those connected with the Oil Industry, or Royalty business. References exchanged.

**JOHN ALLEN**
200 Grand Pacific Hotel Phone 3850
Bismarck, North Dakota

**ARE YOU INTERESTED**
**in**
**SECONDARY RECOVERY**

We are prepared and qualified to assist you in purchasing and will handle development of Water Flood properties in Eastern Kansas and Northern Oklahoma.

Box E-620, The Oil and Gas Journal,
Tulsa, Oklahoma

## LEASE AND DRILLING BLOCKS

FOR LEASE on ⅛ basis 100,000 acres by owner. Located on Cumberland plateau. (Tennessee's coal basin). Both oil and gas now being produced at shallow depths from adjoining acreage. Box E-617, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and Gas Leases and Drilling propositions in Shallow territory of South Central Kentucky. Logs of wells furnished. W. P. Harley, Bowling Green, Ky.

WANTED: Settled producing leases in Illinois Basin, sand or lime, no water. Send particulars. Box E-615, The Oil and Gas Journal, Tulsa, Oklahoma.

CAPITAL immediately available for geologically attractive Drilling Deals, Oil Producing Properties, Producing and Non-Producing Royalties. Send full particulars. Box E-622, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Block of Oil & Gas Leases 6420 acres in T28-29-30N, Range 52E near Murphy Discovery well. For complete details write, call or wire Roosevelt Mid-County Oil Co., Poplar, Montana, phone 2461.

HAVE 1200 acres with good Mississippi pay at 3,000 feet. Will farm out, or take one-fourth interest with other investors. Lewis Short, Burrton, Kansas.

**WANTED TO BUY**

real oil production from owners only. Won't assume overriding royalty. Please quote net price. Principals only.

Box E-628, The Oil and Gas Journal,
P. O. Box 1260, Tulsa, Okla.

**FINE PRODUCTION DEAL**

In heart of good shallow oilfield. Partially developed lease now paying over 30% on investment. Income may be doubled by drilling several offset locations. Low drilling cost. Sell outright or part. Details only to qualified parties.

ARTHUR DAVIDOR
1412 NW 36th St., Oklahoma City

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6835 Delmar Ave., St. Louis 5, Mo

**NORTHWESTERN NORTH DAKOTA**
**LEASES AND MINERALS**

Our latest lists with prices, mailed on request. Will also buy acreage where you want it. Any place in Northwestern North Dakota. References exchanged.

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Oil Properties
4th Floor 1st National Bank Bldg.
Phone 40-228 Minot, North Dakota

**CENTRAL AND EASTERN NEBRASKA**

We have leased substantial acreage to major oil companies but still have undivided interest in over 100,000 acres available for lease to major developers.

Write for details to J. C. Hatfield, Vice President, The Union Central Life Insurance Company, Box 177, Cincinnati, Ohio.

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MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

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**FOR SALE—MAPS**

PERMIAN BASIN WILDCAT MAP OF WEST TEXAS & SE NEW MEXICO. Scale 1"—64,000'. March issue now ready. Just like a newspaper—a quick glance and you know what's happening in the Permian Basin. Revised monthly. Single copy $3.50. Midland Map Company, Box 1211, Midland, Texas.

**LEGAL BLANKS**

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa, Oklahoma.

**LEGAL**

SEALED bids for oil and gas mining leases on certain trust lands on the Crow Indian Reservation, Big Horn County, State of Montana, will be received at the Office of the Superintendent, Crow Indian Agency, Crow Agency, Montana, up to 2:00 o'clock P.M., Mountain Standard Time, March 7, 1952. For further information, call or write L. C. Lippert, Superintendent, Crow Indian Agency, Crow Agency, Montana.


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# $50,000,000
## CAPITAL STRUCTURE

| | |
|---|---|
| CAPITAL | $21,000,000 |
| SURPLUS | 21,500,000 |
| *UNDIVIDED PROFITS | 4,612,345 |
| *RESERVE FOR CONTINGENCIES | 3,520,247 |

Our new Capital and Surplus of $42,500,000—largest of any bank in the South and ranking twenty-second among all the 16,000 banks of the Nation—will enable us to handle more effectively the increasing financial requirements of the great Southwest.

You are cordially invited to use the facilities of this leading Bank—all designed to be helpful in serving the needs of individuals, businesses, and banks.

New Republic Bank Building
Now Under Construction

"We Bank"

—the strong, friendly Bank.

# REPUBLIC NATIONAL BANK of DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

*as of December 31, 1951

## *Another Reason Why*

Cameron Non-Lubricated Lift-Plug Valves are in heavy demand

# *Press-Forged Steel*

**for greater strength and safety**

Another desirable feature which places the Cameron Christmas Tree Valve in a class by itself is the fact that it is of forged alloy steel throughout. Even the flanged body models are press-forged as a single unit. The resulting superior metallurgical properties impart an added factor of safety to the valve.

Add: ease of operation, a tight seal and the elimination of lubrication worries and you have the reason why Cameron Non-Lubricated Lift Plug Valves are in heavy demand.

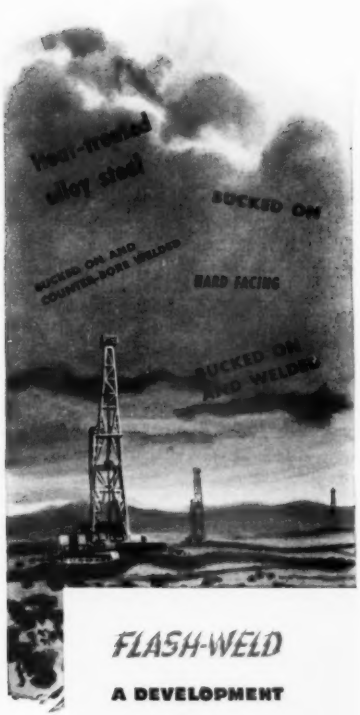
**Cameron**

**NON-LUBRICATED**
**LIFT-PLUG VALVES**

**CAMERON IRON WORKS, Inc., P O Box 1212, Houston, Tex.**

Export Office: 74 Trinity Place, New York, N. Y. Sterling Area: British Oil Field Equipment Co., Ltd., Duke's Court, St. James's, London S.W.1, England. California: Cameron Iron Works of California, Box 267, Long Beach. Canada: Cameron Iron Works of Canada, Ltd., 9860-88th Ave., Suite 3, Edmonton, Alberta.

# Where Do Tool Joint Developments Come From?




Check the records and you'll find that the men who develop rock bits also are responsible for virtually every major improvement in tool joint design.

It's easy to understand why!

Every factor determining the speed and economy of making hole is a concern of Hughes rock bit engineers and field men.

Here's the record of Hughes' developments:

1. First fully heat-treated alloy steel tool joint ...making use of tool joints economically feasible.
2. First tool joint bucked on with controlled torque to prevent galling of pipe threads and washouts.
3. First bucked on and welded tool joint to prevent last engaged thread failures.
4. First bucked on and counter-bore welded tool joint to reduce installation costs.
5. First unitized drill stem—the welding of tool joints and pipe by the Hughes FLASH-WELD process.
6. First hard facing in depth to lengthen life of tool joints.

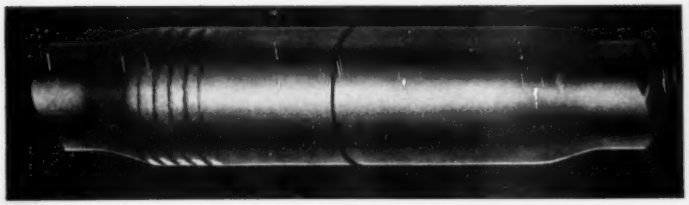
**Each Hughes tool joint development can be traced directly to intimate day-to-day contact with the problem of keeping drilling speeds up and costs down.**

*FLASH-WELD*

**A DEVELOPMENT**

**OF**

**HUGHES**

**TOOL COMPANY**

HOUSTON, TEXAS